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POLICY DEPARTMENT
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Agriculture and Rural Development

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**POSSIBLE EFFECTS ON
EU LAND MARKETS OF
NEW CAP DIRECT
PAYMENTS**

STUDY





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POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES

AGRICULTURE AND RURAL DEVELOPMENT

POSSIBLE EFFECTS ON EU LAND MARKETS OF NEW CAP DIRECT PAYMENTS

STUDY

This document was requested by the European Parliament's Committee on Agriculture and Rural Development.

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Abstract:

Direct payments (DP) in the EU-27 were introduced as the central element of the 2003 CAP reform and are implemented in different models. The 2013 CAP reform will change both the implementation of the DP and their budget. This study assesses the possible effects of the DP reform proposals on EU land markets and the extent to which the DP are capitalized in land prices.

CONTENTS

LIST OF ABBREVIATIONS	5
LIST OF FIGURES	7
LIST OF TABLES	7
EXECUTIVE SUMMARY	9
INTRODUCTION	13
1. LAND MARKETS IN THE EU: SOME KEY CHARACTERISTICS	15
1.1. Rental versus Sales Markets	15
1.2. Agricultural land prices	16
1.3. Evolution of land prices	18
1.4. Land market regulations and institutions	18
2. CAP DIRECT PAYMENTS	23
2.1. Single Payment Scheme (SPS) in the EU-15	23
2.2. Single Area Payment Scheme (SAPS) in the EU-12 (NMS)	25
3. PROPOSALS FOR REFORMS OF THE CAP DIRECT PAYMENTS (DP)	27
4. IMPACT OF DP ON LAND MARKETS – THEORETICAL AND EMPIRICAL INSIGHTS	31
4.1. Conceptual insights	32
4.2. Empirical Findings	36
5. CONCEPTUAL ANALYSIS OF THE DP REFORM EFFECTS ON LAND MARKETS	43
5.1. Change in the MS budget for DP spending (Reform I)	44
5.2. From Historic to Regional SPS (Reform II)	47
5.3. Differentiating DP between Farms and Operation Sizes (Reform III)	49
5.4. Greening of DP (SAPS & SPS) (Reform IV)	50
5.5. Reference Period for Entitlement Allocation (SPS) (Reform V)	50
5.6. Eligibility for Entitlements (Reform VI)	52
5.7. Total Reform Effects (Summary)	56
6. CONCLUSIONS AND IMPLICATIONS	61
REFERENCES	63
ANNEX 1: LAND MARKET REGULATIONS	69
ANNEX 2: EMPIRICAL STUDIES REVIEW	71
ANNEX 3: THEORETICAL MODEL	77
ANNEX 4: DATA SOURCES	81
ANNEX 5: DRIVERS OF LAND PRICES	85

LIST OF ABBREVIATIONS

CAP	Common Agricultural Policy
DP	Direct Payment
EU	European Union
FADN	Farm Accountancy Data Network
GAEC	Good Agricultural and Environmental Conditions
NMS	New Member States
OMS	Old Member States
SAPS	Single Area Payment Scheme
SMR	Statutory Management Requirements
SPS	Single Payment Scheme
UAA	Utilized Agricultural Area

LIST OF FIGURES

Figure 1: Land renting in the EU, 2009 (% of UAA)	16
Figure 2: Nominal Agricultural Land Sales Prices in 2005	17
Figure 3: Nominal Agricultural Land Rental Prices in 2005	17
Figure 4: Total Regulatory Indicator (TRI) and its components	22
Figure 5: Evolution of SAPS and Land Prices in Slovakia and Poland	38
Figure 6: Correlation of SAPS and Land Prices in Slovakia and Poland	38
Figure 7: The impact of direct payments (SAPS) on the land market	45
Figure 8: The effect of SPS on land market	47
Figure 9: The effect of a shift from historical to regional SPS model on the land market	49
Figure 10: The effect of the SPS harmonization between MS	52
Figure 11: The effect of entitlement ownership	56
Figure A1: Land market without DP	78
Figure A2: Land market with SPS	79

LIST OF TABLES

Table 1: Evolution of Real Agricultural Land Sales Prices	20
Table 2: Evolution of Real Agricultural Land Rental Prices	21
Table 3: Direct payment implementation by Member State	24
Table 4: UAA and SPS activated area in 2010	35
Table 5: Estimated impact of decoupled subsidies on farmland prices	41
Table 6: Estimated impact of decoupled subsidies on farmland rents	42

EXECUTIVE SUMMARY

Background

Direct payments (DP) in the EU-27 are implemented in different “models”. The most important distinction is between Single Area Payment Scheme (SAPS) in the NMS (EU-12) and Single Payment Scheme (SPS) in the OMS (EU-15).

The SPS was introduced as the central element of the 2003 CAP reform and Member States had some flexibility regarding its implementation. The EU-15 Member States could opt to apply payment entitlements based on historical individual reference amounts (the “historical model”), payment entitlements calculated as averages of historical reference amounts of a region concerned (the “regional model”) or a mix of the two approaches, either static or dynamic (the “hybrid model”).

The most commonly implemented SPS model in the EU is the *historical model*. In 2012 the historical model was implemented in Austria, Belgium, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain; the *regional model* in Malta and Slovenia; the *static hybrid* in Luxembourg and Sweden; the *dynamic hybrid* in Denmark, Finland and Germany; and a *mixed system* of historical and hybrid models in the UK.

SPS and SAPS payments are usually referred to as “decoupled subsidies”. The SPS and SAPS payments are decoupled from the choice of what to produce, but they are *not* decoupled from land use.

Aim

The objective of this study is to assess the impact of the possible effects of the CAP reform proposals, i.e. the proposed new CAP payments, on EU land.

There are important differences among land markets in EU Member States with respect to

- The nature of the land market (exchanges), in particular the role of rental versus sales markets;
- Level of agricultural land prices;
- Evolution of agricultural land sales and rental prices;
- Land market regulations and institutions.

The prevalence of land renting varies significantly among EU countries, ranging from 17% in Ireland where most land is owned by farms, up to 96% in Slovakia where almost all land is rented by farms.

Land sales prices are considerably lower in the EU-12 than in the EU-15. The lowest prices can be observed in Lithuania (536 euro/ha), followed by Romania (879 euro/ha) and Slovakia (981 euro/ha) and they range up to 22053 euro/ha in Belgium and 30235 euro/ha in the Netherlands. Rental prices are also much lower in the EU NMS than in the EU OM. Rental prices in the EU range from 15 euro/ha in Slovakia to 97 euro/ha in Bulgaria to 397 euro/ha in Denmark and 429 euro/ha in the Netherlands.

There are also major differences in regulation of land markets. In some countries, land prices and rental contracts are regulated by the government, in others not. Both among

the new and among the old Member States there are strongly regulated and very liberal approaches in land governance. For the 24 EU countries for which we have data, the most regulated land “markets” are in France and Hungary. The most liberal are in Greece, Ireland and the UK among the old Member States and in Romania and Czech Republic among the new Member States.

Measuring the impact of DP on land markets is often difficult because land prices are influenced by a variety of other factors, such as agricultural prices/farm profits, location, economic growth, other types of farm subsidies, various regulations (such as zoning, rental and sales market restrictions, ...), etc; because adjustments occur only gradually and because there are significant data problems for the measurement and statistical estimations.

Studies show that DP (both SAPS and SPS) are capitalized in land prices and that the impact of the DP on land prices depends (among others):

- (for SPS) on the ratio of land entitlements to eligible land,
- (for SPS) on the implementation model (historical vs regional),
- (for SPS) on the tradability of the entitlements,
- on the elasticity of land supply,
- on cross-compliance requirements,
- on land market regulations,
- on credit market constraints,
- on the length of the rental contracts,
- on bargaining power in the land market.

NMS land sales and rental prices have increased strongly with the increase in SAPS since accession in 2004. The correlation between the DP and the land prices is very strong. However, land prices are also affected by other factors. Econometric studies on the impact of SAPS payments on land rents in the NMS find that between €0.15 and € 0.32 per additional euro of SAPS payment is capitalized in the land rental price increases.

There is significant capitalization of SPS in the EU-15, but with strong variation among regions and among farms. Overall, studies find that between €0.06 and € 0.94 per additional euro of SPS payment is capitalized in land values in the EU-15. Moreover, the variation is consistent with theoretical predictions on lower capitalization in the historical compared to the regional model. Capitalization is much higher for low levels of SPS than for high levels, which is consistent with theoretical predictions on the historical SPS model.

Estimations of the impact of cross-compliance costs suggest that the payments are not sufficient to cover the additional costs associated with cultivating plots eligible for this type of payments. Studies also find that (a) there is stronger capitalization of SAPS in more credit constrained markets, and (b) that capitalization of SAPS is lower in countries where more land is used by corporate farms, reflecting a strong bargaining position of the farms in the land market.

The 2013 CAP reform will change both the implementation of the DP and their budget. Some measures like the shift from historical to regional SPS will induce a harmonization of payments across MS and across farms, while other reforms such as the progressive reduction of the DP per farm will cause an increased differentiation in per hectare DP. Other reform issues relate to the linkage of the so called ‘CAP greening’, the reference period for entitlement allocation and the definition of farms eligible for DP.

A conceptual analysis of the DP reform effects on land markets yields the following hypotheses on the effects of these reforms.

Change in the MS budget for DP spending (Reform I)

There will be a decline in the EU budget for DP spending and within the reduced overall budget a reallocation of DP budget from OMS to NMS. This means (a) that in most OMS the MS budget will decline for SPS spending and (b) that in the NMS the MS budget may increase or decrease for SAPS spending. The effect of the change in SAPS in the NMS will be reflected in land prices. Much of this change (whether it will increase or decrease) will be captured by changes in land prices.

The effect of the decline in the budget for SPS (in the EU-15) will be similar as a decline in SAPS budget (in the NMS) *if there are sufficient entitlements* (i.e. if allocated entitlements are in surplus relative to the eligible area). If not, there will be no effect on the land market.

From Historic to Regional SPS (Reform II)

The harmonization of SPS within a country/region, when the historical model is replaced by a regional model for SPS entitlement allocation, is likely to increase land rents (thus increase capitalization of DP in land prices). The reason is that the land rents (and capitalization of DP) are determined at the margin – as any price is in economics – and demand for land will go up at the margin with harmonization.

Differentiating DP between Farms and Operation Sizes (Reform III)

Reforms as additional DP for young farmers and disadvantaged areas and DP which are lower beyond a certain farm size, etc –effectively increase differentiation of per hectare DP value. At the margin the demand is going to be lower than in the case of more harmonized payments. Hence, these reforms will likely reduce land prices and capitalization.

Greening of DP (SAPS & SPS) (Reform IV)

The effect of greening on the land market is likely to be a decline in land rents. The size of this effect may be small, depending on the precise conditions for “greening” and how these requirements are implemented (and controlled).

Reference Period for Entitlement Allocation (SPS) (Reform V)

With the implementation of the 2013 CAP reform, the old entitlements will expire and new entitlement will be allocated to farms. A key factor that will impact income effects is whether the new entitlement allocation will be different from the current allocation. Applicants can apply for the number of entitlements equal to their optimal land use (taking into consideration both the economic return from land and the entitlement value). This could have potentially important effects on the land market, depending on the precise implementation and the existing capitalization.

A change may occur in a region where there has not been capitalization of SPS because the amount of entitlements was less than available land. An increase in entitlements could shift the ratio of entitlements/land to the point that the entitlement constraint is no longer binding and capitalization would occur. A small increase in entitlements has a

disproportional effect on land markets as rents increase strongly because of the competition for land which has intensified at the margin.

Eligibility for Entitlements (Reform VI)

Despite the EU regulations implying that only farms were eligible for SPS entitlements, in several MS implementing the hybrid SPS model also non-farming landowners applied for and received entitlements. There is also some evidence that landowners have captured the DP (SAPS) in NMS. The 2013 CAP reform attempts to prevent non-farming landowners from obtaining entitlements by more closely defining the concept of 'active farmer'.

The benefits of the DP accrue only to those who receive the entitlements in the specific case when (a) SPS are used (not SAPS), and (b) there is surplus land compared to the entitlements. In this case, whoever gets the SPS entitlements gets the full subsidies since there is no impact on the land markets. However, in other situations it matters less whether farms or landowners receive the entitlements – the effects in terms of land allocation and incomes for farmers and landowners can be similar. The reason is that in order to get the actual subsidies one needs to have both entitlements and the land being used/kept in good states. (This is similar to the result that consumer subsidies and producer subsidies have identical effects in closed economies with well functioning markets).

INTRODUCTION

The Single Payment Scheme (SPS) was introduced as the central element of the 2003 CAP reform and Member States had considerable flexibility regarding its implementation. The EU-15 Member States could opt to apply payment entitlements based on historical individual reference amounts (the "historical model"), payment entitlements calculated as averages of historical reference amounts of a region concerned (the "regional model") or a mix of the two approaches, either static or dynamic (the "hybrid model").

Aside from Malta and Slovenia, the other ten Member States that joined the EU in 2004 and in 2007 implemented the Single Area Payment Scheme (SAPS), involving a nationally applied uniform per hectare payment.

A European Commission funded study from 2008 analysed the influence of the introduction of the SPS on land markets and land values in the European Union (EU) (Ciaian, Kancs and Swinnen 2010). The results show that SPS payments are to varying extents capitalized in land values. Other studies showed that also SAPS payments had an impact on land markets (Ciaian and Kancs 2012; Van Herck and Vranken 2013).

The objective of this study is to assess the impact of the possible effects of the 2011-13 CAP reform proposals, i.e. the proposed new CAP payments, on the EU land market.

The study combines conceptual and empirical analyses and case study evidence as part of a comparative analysis between Member States. Therefore the study uses data from various sources.

The report is organized as follows. Section 1 discusses some key characteristics of EU land markets. A description of SAPS and SPS is provided in section 2. CAP reform proposals are listed in section 3. Insights from previous studies concerning the impact of DP on land markets are discussed in section 4. A conceptual analysis of the DP reform effects on land market is provided in section 5. Section 6 discusses implications.

1. LAND MARKETS IN THE EU: SOME KEY CHARACTERISTICS

KEY FINDINGS

There are important differences among land markets in EU Member States.

The nature of the land market (exchanges), in particular the role of rental versus sales markets, varies significantly among EU countries.

The level of agricultural land sales and rental prices are considerably lower in the EU-12 than in the EU-15.

There are also major differences in regulation of land markets. In some countries, land prices and rental contracts are regulated by the government, in others not. Both among the new and among the old Member States there are strongly regulated and very liberal approaches.

There are important differences among land markets in EU Member States (see Ciaian, Kancs and Swinnen 2010 and Swinnen and Vranken 2009 for detailed analyses) with respect to:

- The nature of the land market (exchanges), in particular the role of rental versus sales markets;
- Level of agricultural land prices;
- Evolution of agricultural land sales and rental prices;
- Land market regulations and institutions.

1.1. Rental versus Sales Markets¹

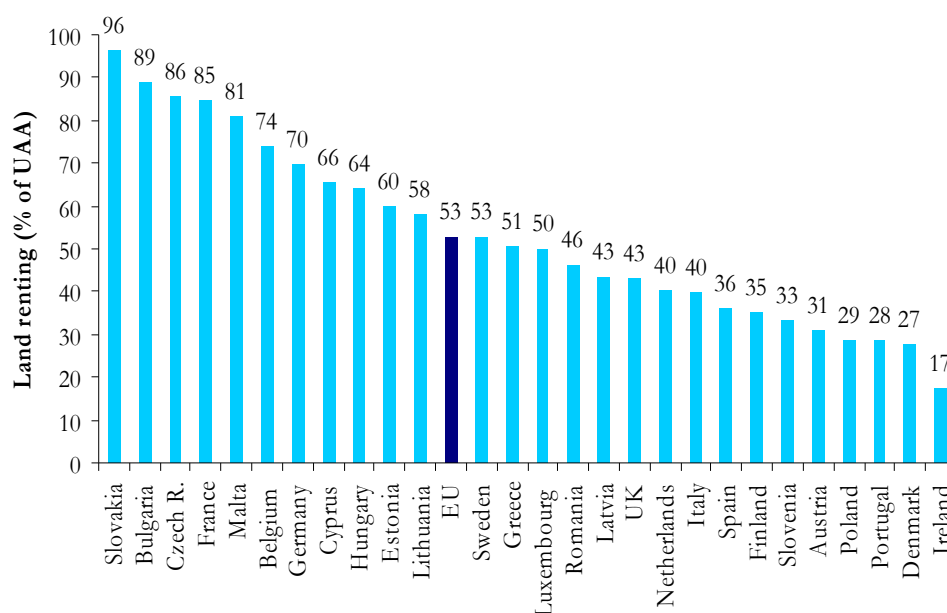
There is a wide variation in the EU-27 land markets (and within the EU-15 and EU-12) with respect to the share of rented land in the total utilized agricultural area (UAA). The EU-average share of rented land in UAA is 53% (Figure 1). The prevalence of land renting varies significantly among EU countries, ranging from 17% in Ireland up to 96% in Slovakia. The share of rented land is the highest in Slovakia, Bulgaria, the Czech Republic, France, Belgium, Malta and Germany (more than 70% of the total UAA). In other MS (e.g. Hungary, Lithuania, Sweden, Greece, Romania, UK, the Netherlands, Italy) land renting is between 40% and 70%. In the rest of MS, farms rent between 17% and 40% of the total UAA.

There are also large differences in the nature of the rental contracts among EU MS. For example, the average duration differs strongly. The most common contract duration is 1 year in Sweden, 5 years in Romania, 5 to 10 years in Slovakia and Poland, 9 to 12 years in

¹ There are no representative data on land markets in the EU. In this study we use different data sources, including the Farm Accountancy Data Network (FADN), Eurostat, and the databases constructed by Ciaian *et al.* (2010) and Swinnen and Vranken (2007, 2010) based on national statistics and national experts surveys. FADN data has the advantage of (a) farm-level panel data, (b) a large sample size, and (c) cross-country comparability. The FADN data disadvantage is that smaller farms are not represented. This is particularly problematic for NMS where a significant proportion of the agricultural land is used by small farms.

Germany. In some countries (such as Belgium and France) the length of the contract is regulated, in others not – see further.

Figure 1: Land renting in the EU, 2009 (% of UAA)



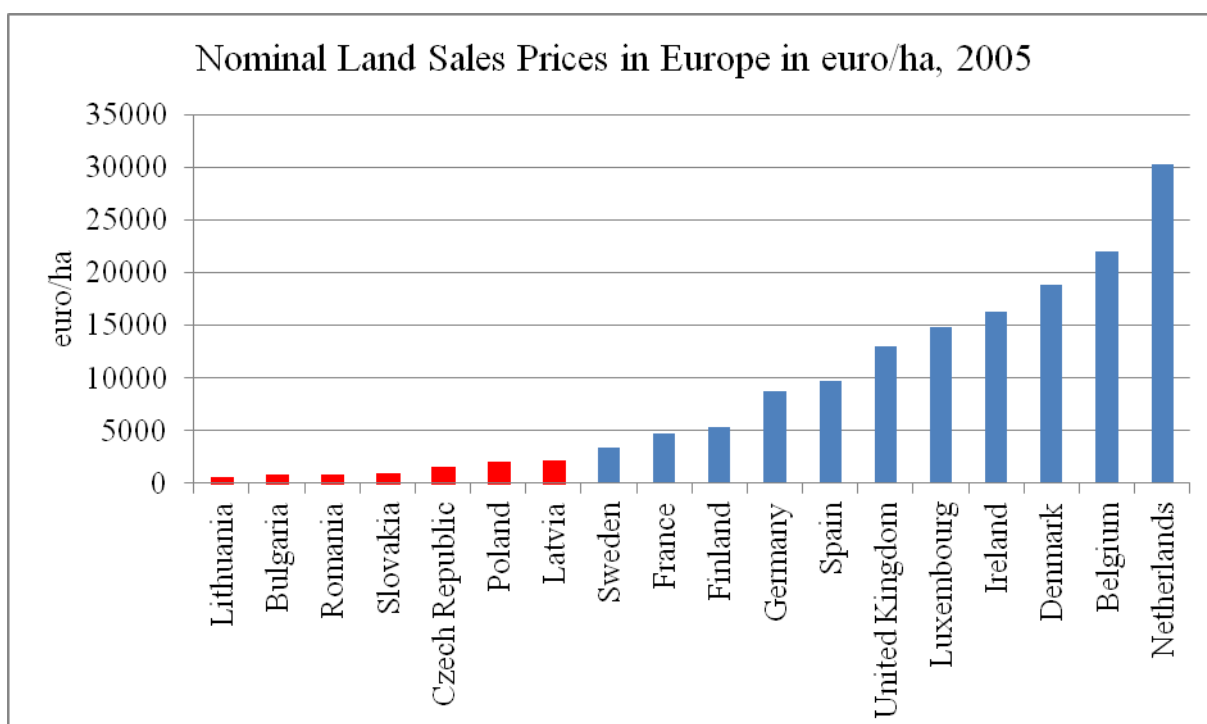
Source: Calculated based on FADN data.

1.2. Agricultural land prices

Agricultural land sales and rental prices vary strongly within the EU-27. Figures 2 and 3 compare the levels of sales and rental prices among EU-27.

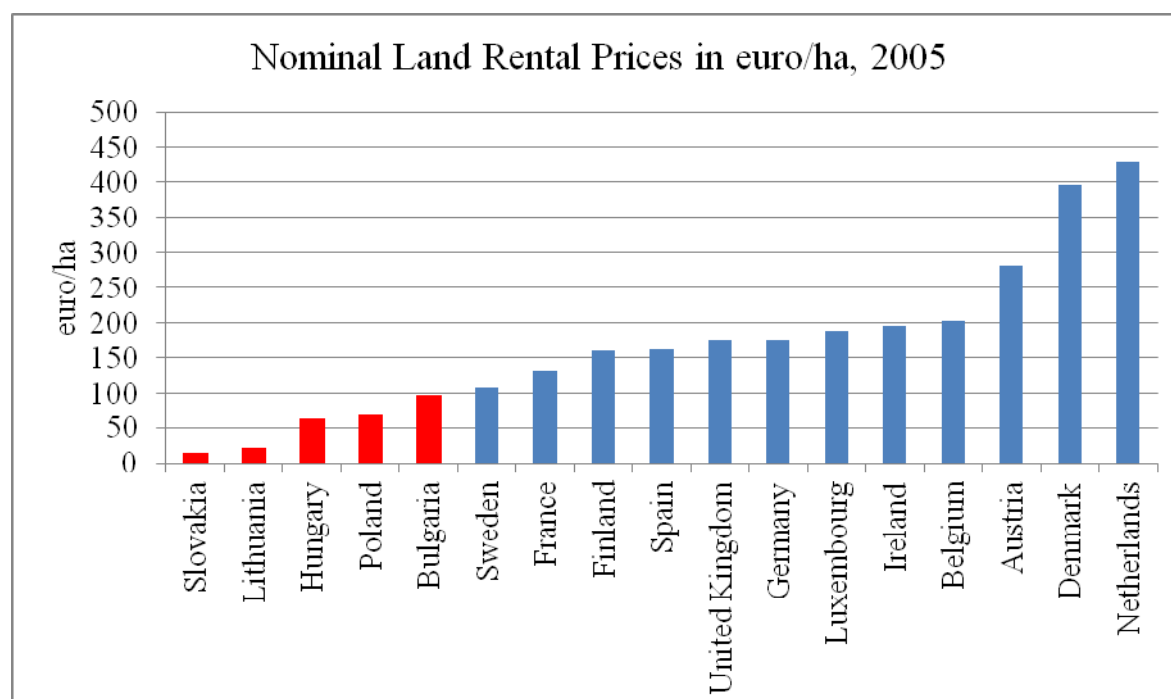
Land **sales** prices are considerably lower in the EU-12 than in the EU-15. In 2005, the year for which most sales prices are available, the lowest prices can be observed in Lithuania (536 euro/ha), followed by Romania (879 euro/ha) and Slovakia (981 euro/ha). In the Czech Republic and Latvia, land sales prices are a bit higher (respectively 1621 euro/ha and 2183 euro/ha) than in Lithuania, Romania and Slovakia but still well below the levels observed in the EU-15. Also within the EU-15, there is a wide variation in land sales prices in 2005. They range from 3351 euro/ha in Sweden and 4700 euro/ha in France to 22053 euro/ha in Belgium and 30235 euro/ha in the Netherlands.

A comparison of land **rental** prices yields similar conclusions. Rental prices are much lower in the EU NMS than in the EU OM. In 2005, rental prices in the EU NMS range from 15 euro/ha in Slovakia to 97 euro/ha in Bulgaria. In the EU OMS, rental prices vary from 108 euro/ha in Sweden and 131 euro/ha in France to 397 euro/ha in Denmark and 429 euro/ha in the Netherlands.

Figure 2: Nominal Agricultural Land Sales Prices in 2005

Note: Sales prices for arable land for Bulgaria and Poland. Prices for 2005 are shown because this is the last year for which data are available for the majority of MS.

Source: Eurostat (2013).

Figure 3: Nominal Agricultural Land Rental Prices in 2005

Note: Rental prices for arable land for Belgium, Austria and Poland. Rental prices for 2006 for the UK. Prices for 2005 (and 2006 for the UK) are shown because this is the last year for which data are available for the majority of MS.

Source: Euostat (2013).

1.3. Evolution of land prices

The evolution of real land sales and rental prices is presented in Tables 1 and 2. In some countries such as Denmark, Finland, Sweden and UK, real land sales prices increase relatively steadily from 1996 until 2008. In Belgium and the Netherlands, there is an increasing trend in real land sales prices, but the yearly price variation is larger in these two countries. On the other hand, a slightly decreasing trend in real land sales prices is observed in Germany between 1996 (12016 euro/ha) and 2008 (8751 euro/ha).

Rental prices have evolved very differently within the EU-27 (Table 2). In some countries such as Ireland, real rental prices declined from 362 euro/ha in 1997 to 180 euro/ha in 2006 (corresponding to an average annual decline of 5.6%), while in other countries such as Denmark the real rental price increased from 352 euro/ha in 1996 to 469 euro/ha in 2009 (corresponding to an average annual increase of 2.5%). In France and Belgium, two countries with highly regulated land rental markets (see further), real rental prices declined slightly over the past years. The average annual decrease in real rental prices was 0.2% in Belgium between 1996 and 2005 and 0.6% in France between 1996 and 2009.

The prices presented in Figures 1 and 2 and Tables 1 and 2 are country averages. There are typically large land price variations within a country depending on the quality of the plot, the size of the plot and the tenant in the case of rental. Within a country prices paid for arable land are sometimes twice as high as prices for grassland. Regarding the size of the plot, the country experts interviewed for this study (see Table 3) as well as previous studies (Swinnen *et al.* 2006) showed that higher sales prices are paid for smaller plots and that this typically holds in areas where urban pressures are high and where farmers are more credit constrained. Rental payments also vary strongly with the type of tenant. This particularly holds for the EU NMS where large corporate farms are dominating the land rental market and where land ownership is highly fragmented among small non-farming land owners. These corporate farms use their bargaining power to negotiate the contract terms in their advantage. Consequently, large scale farming corporations in the EU NMS typically pay lower rents and more often in kind than family farms.

1.4. Land market regulations and institutions

Not only are there major differences in the nature of land markets in Europe, both over time and across countries, but there are also major differences in regulation of land markets. In some countries, land prices and rental contracts are regulated by the government, in others not. One can identify several categories of land market regulations: (1) measures to protect the tenant; (2) measures to protect the owner-cultivator; (3) measures to protect the owner; and (4) measures to prevent fragmentation.

To assess the importance and stringency of land regulations and to indicate the differences between countries, Swinnen, Van Herck and Vranken (2013) have collected data on land regulations, and developed a set of regulatory indices to compare countries. They use 15 regulatory variables to construct indicators. The total regulatory indicator (TRI) measures of the total amount of regulations in the land market. Figure 4 shows that there is a large difference among the EU countries in land market regulations, and the variation in interventions is not a simple East-West divide. Both among the new and among the old Member States there are strongly regulated and very liberal approaches in land governance. For the 24 EU countries for which we have data, the most regulated land

“markets” are in France (TRI = 9) and Hungary (TRI=8).² The most liberal are in Greece (TRI = 0.25), Ireland (TRI = 0.0) and the UK (TRI = 0.5) among the old Member States and in Romania (TRI = 1.5) and Czech Republic (TRI = 2.5) among the new Member States.

² In France, regional organizations – the so-called SAFERs – determine a minimum and maximum price bracket within which the tenant and the owner can agree a contract price. These organisations effectively control the local land markets through their powers to buy, sell and rent out agricultural land. Effectively, they ensure that land is only owned by working farmers. The SAFERs also control the level of farm restructuring and growth by requiring farmers to get authorisation from them for farm expansion. In Hungary, land can only be owned by individuals or families (“natural persons”) – not by farming companies which operate a large share of the land. Ownership is restricted to Hungarian nationals and owners have an obligation to farm the land.

Table 1: Evolution of Real Agricultural Land Sales Prices

	Average real sales prices				% change			
	1996-1997	2000-2001	2004-2005	2008-2009	2000/2001 vs 1996/1997	2004/2005 vs 2000/2001	2008/2009 vs 2004/2005	2008/2009 vs 1996/1997
Belgium	15163	22872	22856		51	0		
Denmark	9781	12426	17565	26660	27	41	52	173
Germany	12090	10210	9063		-16	-11		
Ireland	8271	14733	16421		78	11		
Spain	5929	8190	9467	9927	38	16	5	67
France	3740	4027	4629	4764	8	15	3	27
Italy	14415	15402			7			
Luxembourg			15528	17525			13	
Netherlands	25039	40197	31176	40725	61	-22	31	63
Finland	3262	4398	5344	6429	35	21	20	97
Sweden	1674	2195	2929	3671	31	33	25	119
United Kingdom	9866	12981	12172	16482	32	-6	35	67
Bulgaria		786	783	1442		0	84	
Czech Republic		1634	1608	2142		-2	33	
Latvia			1603	1368			-15	
Lithuania		339	475	948		40	99	
Romania		364	584			61		
Slovakia		978	973	1142		-1	17	

Note: Sales prices for arable land for Bulgaria and France (1996-2002). Real prices are calculated using the HICP for the Euro Area (17 countries). Eurostat data for Poland are excluded because of the inconsistency with national data as of 2006.

Source: Eurostat (2013).

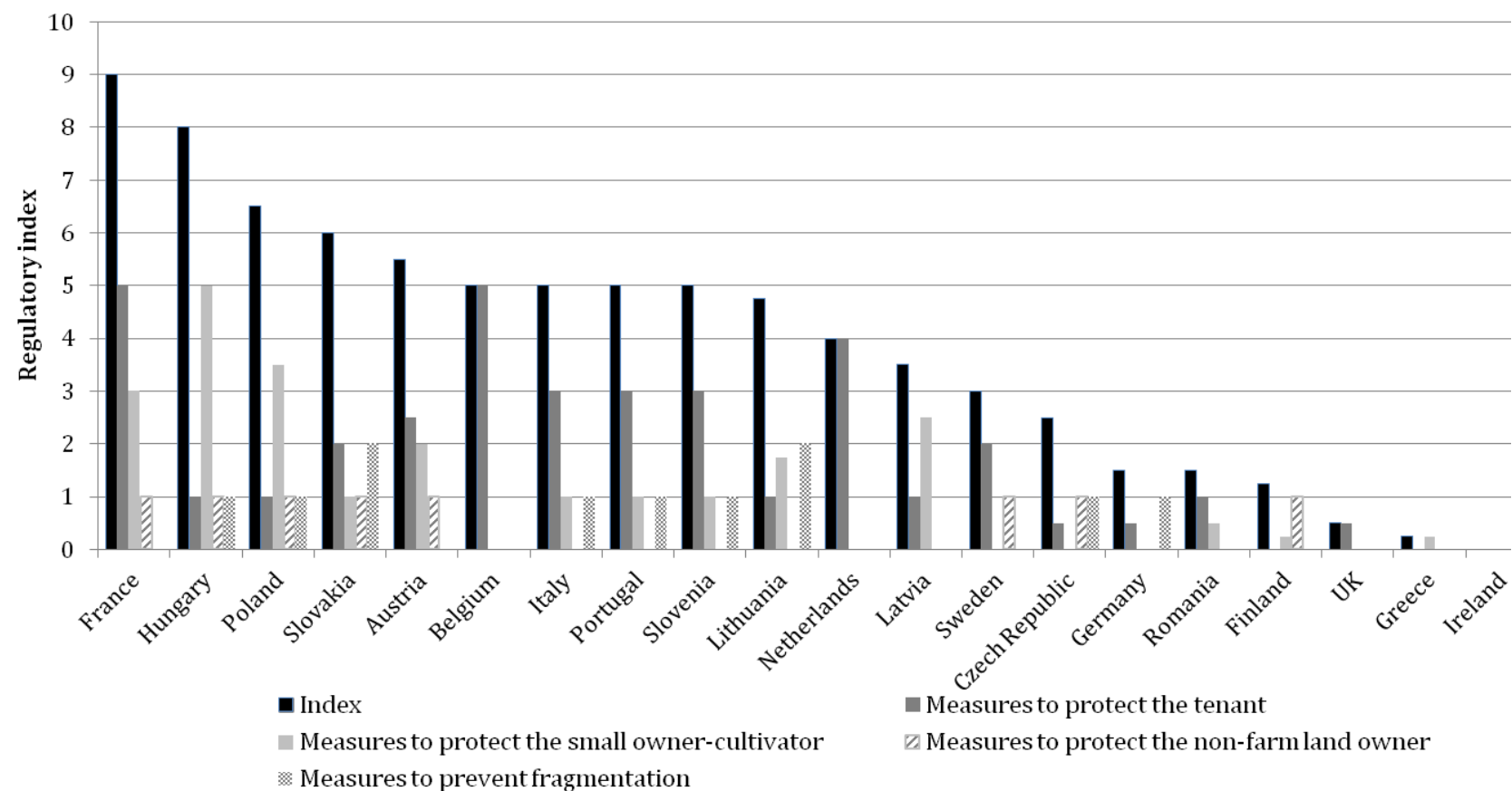
Table 2: Evolution of Real Agricultural Land Rental Prices

	Average real sales prices				% change			
	1996-1997	2000-2001	2004-2005	2008-2009	2000/2001 vs 1996/1997	2004/2005 vs 2000/2001	2008/2009 vs 2004/2005	2008/2009 vs 1996/1997
Belgium	207	208	204		0	-2		
Denmark	350	372	402	464	6	8	15	33
Germany	175	179	176		2	-2		
Ireland	324	251	202		-23	-20		
Spain		153	160	153		5	-4	
France	146	145	132	128	0	-9	-3	-12
Luxembourg	178	182	185	171	2	2	-8	-4
Netherlands	333	468	444	440	41	-5	-1	32
Austria	292	268	281	300	-8	5	7	3
Finland	165	153	160	168	-7	4	5	2
Sweden	112	116	110	110	4	-5	0	-1
United Kingdom		222	185			-17		
Bulgaria		62	86			39		
Czech Republic				44				
Lithuania		12	20	38		71	92	
Hungary		45	61	83		36	37	
Slovakia		15	15	17		0	17	

Note: Rental prices for arable land for Belgium, France (1996-2002) and Austria. Real prices are calculated using the HICP for the Euro Area (17 countries). . Eurostat data for Poland are excluded because of the inconsistency with national data as of 2006.

Source: Eurostat (2013).

Figure 4: Total Regulatory Indicator (TRI) and its components



Source: Swinnen, Van Herck and Vranken 2013.

2. CAP DIRECT PAYMENTS

KEY FINDINGS

Direct payments (DP) in the EU-27 are implemented in different “models”. The most important distinction is between SAPS in the NMS (EU-12) and SPS in the OMS (EU-15). Another important distinction is within the SPS regime, where some MS are using the “historical SPS model”, some the “regional SPS model”, and some a mixture of both: the (static or dynamic) “hybrid SPS model”. We will first briefly introduce some key aspects of these DP models which are essential to understand the impact of the CAP reforms on the land market. SPS and SAPS payments are usually referred to as “decoupled subsidies”. The SPS and SAPS payments are decoupled from the choice of what to produce, but they are *not* decoupled from land use.

Direct payments (DP) in the EU-27 are implemented in different “models”. The most important distinction is between SAPS in the NMS (EU-12)³ and SPS in the OMS (EU-15). Another important distinction is within the SPS regime, where some MS are using the “historical SPS model”, some the “regional SPS model”, and some a mixture of both: the (static or dynamic) “hybrid SPS model”. We will first briefly introduce some key aspects of these DP models which are essential to understand the impact of the CAP reforms on the land market.

The concept of “decoupled” subsidies

SPS and SAPS payments are usually referred to as “decoupled subsidies”. However, in the framework of this study the concept of “decoupled” should be interpreted with care. The SPS and SAPS payments are decoupled from the choice of what to produce, but they are *not* decoupled from land use. This has major implications for the impact on the land market – and it makes the relationship between entitlements and land a crucial one to understand (or predict) the land market impact of (changes in) the DP.

2.1. Single Payment Scheme (SPS) in the EU-15

The SPS was introduced by the 2003 CAP reform and it was implemented starting from 2005 and runs until 2013.⁴ The SPS replaced coupled subsidies which included crop area payments and animal payments. Under the SPS, entitlements are allocated as a fixed set of payments per farm. Farms are entitled to yearly payments, depending on the number of the SPS entitlements and the eligible land they possess.

Regional, Historical, and Hybrid SPS Models

When implementing the SPS, the EU-15 Member States (MS) could choose between three different SPS implementation models: the *historical* model, the *regional* model, and various *hybrids* of these two. Under the historical model, the Single Payment is farm-specific and equals the support the farm has received in the “reference” period.⁵ Under the regional model, an equal per hectare payment is granted to all farms in a given region based on the total payments historically paid in that region and the number of entitlements established

³ The exception is Malta and Slovenia which implement SPS.

⁴ MS could choose to introduce the SPS either in 2005 or in 2006.

⁵ The reference period was 2000–2002.

in the first year of operation. The hybrid model is a combination of historical and regional models, and has two versions: a static and a dynamic.

The key difference between the models is in the variation in unit value of entitlements. Under the historical and hybrid models the value of entitlement varies, sometimes considerably, between farms. This is particularly under historic allocations. Whereas under the regional SPS model, all farms in a region have entitlements with the same unit value. The main source of differentiation is the past (production) coupled subsidies, which determine the SPS value at farm level fully in the historical model and partially in the hybrid model.

The most commonly implemented SPS model in the EU is the *historical model*. In 2012 this was implemented in Austria, Belgium, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. The *regional model* was implemented in Malta and Slovenia; the *static hybrid* in Luxembourg and Sweden; the *dynamic hybrid* in Denmark, Finland and Germany; and a *mixed system* of historical and hybrid models in the UK (see Table 3). Those MS implementing the dynamic hybrid model move gradually to a fully regional model. In MS implementing the static hybrid model, the regional and the historical shares do not change over time (European Commission 2007).

Table 3: Direct payment implementation by Member State

Model SPS / SAPS	MS (start date)
SPS historical	Austria (2005), Belgium (2005), France (2006), Greece (2006), Ireland (2005), Italy (2005), Netherlands (2006), Portugal (2005), Spain (2006), UK (Wales and Scotland)
SPS regional	Malta (2007), Slovenia (2007)
SPS static hybrid	Luxembourg (2005), Sweden (2005), UK (N. Ireland, 2005)
SPS dynamic hybrid	Denmark (2005), Finland (2006), Germany (2005), UK (England 2005)
SAPS	Bulgaria (2007), Czech R. (2004), Estonia (2004), Cyprus (2004), Latvia (2004), Lithuania (2004), Hungary (2004), Poland (2004), Romania (2007), Slovakia (2004)

Source: European Commission.

In the first year of the SPS implementation, each farm was allocated a given amount of SPS entitlements depending on the SPS model and the eligible area of the farm.⁶ Farms can activate the entitlements and receive the SPS if they are *accompanied* by an equal amount of eligible land. This implies that there is a direct link between SPS and land because, in the absence of land, farms cannot activate (cash in) the SPS entitlements. However, the SPS is

⁶ The total amount of allocated entitlements tends to be smaller with the historical model than with the hybrid model or regional model. The reason is that the total number of entitlements in the hybrid model is equal to all eligible land at the time of SPS implementation, as noted earlier; in contrast, in the historical model entitlements are linked to the number of hectares that generated subsidies in the reference period. As a result, typically, the total SPS amount is distributed to a smaller number of entitlements under the historical model than under the hybrid model leading to higher per hectare values of entitlements. Note that a percentage of national entitlements is kept in a reserve ("national reserve") which can be used to grant entitlements to farmers in special situations (e.g. newcomers, force majeure cases, investments). Entitlements allocated to farmers which are not used during a predefined period are reverted to the national reserve.

not linked to any specific geographic land area – the SPS entitlements can be activated by any eligible farmland in the region which is 'at the disposal' of the claimant, and for which he is then responsible for the cross compliance.

Furthermore, farms can expand or decrease their stock of entitlements by buying or selling entitlements or through lease arrangements (to/from other farms). Entitlements can be traded by sale with or without land, whereas lease is allowed only if entitlements are accompanied by the equivalent number of eligible hectares. In case of sale or lease, MS may impose a "tax" by which a part of the payment entitlements sold reverts to the national reserve or that their unit value is reduced. Note that the entitlement trade is allowed only within EU Member States, not between them.

Cross compliance

Farm eligibility to the SPS is subject to cross compliance. Each farm that receives the SPS must comply with the Statutory Management Requirements (SMR), and maintain the agricultural land in Good Agricultural and Environmental Condition (GAEC). The SMR are based on pre-existing EU Directives and Regulations in the fields of environment, public, animal and plant health and animal welfare.

The aim of the GAEC is to ensure that all agricultural land, especially land which is no longer used for production purposes, is maintained in good agricultural and environmental conditions. The GAEC relates to soil management, minimum levels of land maintenance, protection and management of water and protection and maintenance of permanent pasture. Given its wide coverage and the wide land and farm heterogeneity across the EU, the implementation of GAEC is quite variable across the MS.

2.2. Single Area Payment Scheme (SAPS) in the EU-12 (NMS)

When the Eastern New Member Countries (NMS – EU-12) joined the EU in 2004 and 2007 they introduced a system of Direct Payments (with the exception of Slovenia and Malta), called Single Area Payment Scheme (SAPS) which is slightly different from the SPS.⁷ The SAPS is a payment per hectare (independent of the production activities on the land – hence "decoupled") but without a system of "entitlements". Farms are eligible for SAPS for all the eligible agricultural area they manage in a given year. Further, the SAPS value per hectare is uniform across all farms within a MS. The SAPS amount per hectare is calculated by dividing the national financial envelope by the national eligible agricultural area. Hence, it works as a regional SPS (flat-rate), but without a limit on the entitlements.

Another distinction between SPS and SAPS is that the New Member States implementing SAPS do not have to apply the full cross-compliance package. The minimum condition for granting SAPS to farms is the maintenance of the land in Good Agricultural and Environmental Condition. That is, only the GAEC was required from the start. The full introduction of the SMR is delayed until the new Member States are receiving full direct payments.⁸ The NMS are allowed to incorporate the SMR over a four-year period starting in 2009, with the exception of Bulgaria and Romania, where the progressive integration process started in 2012.⁹

⁷ Originally, SAPS was established for a period of up to 5 years after the accession. Following the 2008 "Health Check" of the CAP Reform, the validity of SAPS was extended until the end of 2013 (European Commission 2013).

⁸ Direct payments were phased in gradually in NMS starting at 25% of the full value in the first year of accession and continuously increase to 100% over 10 year interval. Note that in addition to SAPS, farmers could receive complementary national direct payments financed from the national budgetary sources in the form of coupled direct payments (e.g. area payments linked cultivation of certain crops, animal payments).

⁹ NMS implementing SPS (Malta and Slovenia) have to apply cross-compliance requirements in full.

3. PROPOSALS FOR REFORMS OF THE CAP DIRECT PAYMENTS (DP)

KEY FINDINGS

The 2013 CAP reform will change both the character of the direct payments (DP) and their budget. Some measures, such as the shift from historical to regional SPS, will induce a convergence of payments within MS (or regions) and across farms, while other reforms, such as the targeting on small farms, young farmers, farms in areas of natural constraints, the wider use of coupled payments and payment cutting and capping may lead to a divergence in payment rates between farms. There is also an attempt to reduce the divergence in payment rates expressed per hectare between the Member States. Other reform issues which can have impacts on land values and rents concern: the proposed 30% of payments which will relate to the linkage of the so-called 'CAP greening', the reference period for entitlement allocation and the definition of farms eligible for DP, the so-called 'active farmers'.

Discussions and negotiations about the 2013 CAP Reform started in earnest following the publication of the Commission's communication in 2010, and then after the legislative proposals were published in 2011 and are now in their final stages. The precise reforms are still unclear because the negotiations between the European Council, the European Parliament and the European Commission are still on-going. In this report, we focus on the reforms which appear likely given the development of the negotiations. Implementation of the reformed direct payments will not commence until January 2015.

The 2013 CAP reform will change both the character of the direct payments (DP) and their budget.

- I. The budget for DP for specific Member States (called their national ceilings) will change because of two budgetary effects. The overall CAP budget will be reduced as a result of the new Multiannual Financial Framework, and there will be a harmonization of payments across Member States. The latter aims to reduce a third of the gap between the DP value per hectare across MS by reducing high value DP, and increasing low value DP. Under the current CAP, the size of the DP varies significantly by MS. Map 1 illustrates how the average DP per hectare vary from more than 500 euro per hectare to less than 100 euro per hectare, with the NMS typically having lower average DP than the EU-15.

In addition, MS will have the capacity to further reduce or increase their DP fund if they choose to make use of the proposed 'flexibility between pillars'.

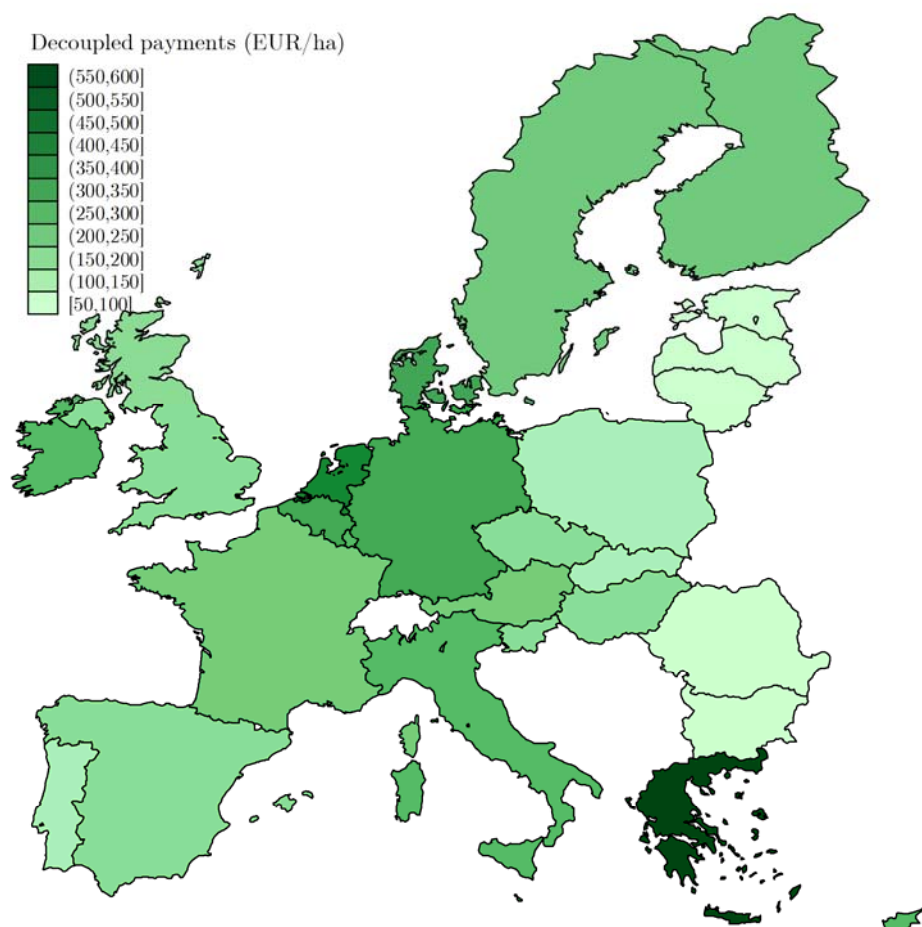
- II. There will also be a harmonization of DP within some of the MS. This applies to the MS which give SPS under the historical model. The reforms require a shift towards the regional SPS model, which implies a harmonization of SPS across farms (i.e. towards a flat-rate SPS value) at MS (or regional) level.
- III. The reform includes many other changes in the DP, which may cause increased differentiation in per hectare DP between farms.

- a. Certain farm types, such as young farmers, new entrants and farms located in disadvantaged areas (to be called areas of natural constraints), may receive additional payments that supplement the DP.
- b. The reform foresees a progressive reduction of the DP per farm where those payments exceed €150 thousand and capping of the total DP value at a maximum per farm.
- c. The reform proposes a higher value of the DP for the first 50 hectares and a lower entitlement value for the rest of area.
- d. Small farms may receive a simplified and flat rate payment, and also the scope to widen the scope of use of coupled payments may further redistribute funds.

Each of these elements of the reform may increase differentiation of per hectare DP value across and within MS and regions in the EU (and will have thus an opposite effect as the harmonization effect discussed above).

- IV. The reformed CAP will impose a stronger linkage of the DP to “agricultural practices beneficial to the climate and environment” (so called ‘CAP greening’). The conditions are more demanding than under current cross-compliance requirements, but similar to cross compliance, farms’ failure to fulfil the greening requirement may result in reduction of the DP.¹⁰
- V. An important issue under discussion is the reference period for the allocation of the new payment entitlements. With the new DP system, the old entitlements will expire and new entitlements will be allocated to farms when the scheme is launched (most likely in 2015). According to the CAP reform proposal, entitlements will be allocated to those farms, which will apply for it in 2014, and MS may impose restriction that only those farms are allocated entitlements who were DP recipients prior to 2014 (European Council 2013).
- VI. Another issue being discussed is a better definition of farms eligibility for the SPS. The policy objective is to identify active farmers, avoiding payments to inactive landowners.

¹⁰ The 2013 consolidated draft proposal stipulated that the DP will be supplemented by an additional ‘greening’ payment taking up to 30% of the DP funds, if farms respect the ‘greening’ requirements. The CAP greening consists of three main requirements: crop diversification, maintenance of permanent grassland and ecological focus area (set-aside). Under the crop diversification, the cultivation of the arable land needs to include at least two different crops on farms cultivating between 10 and 30 hectare of arable land and at least three crops on farms with a larger arable area. Additionally, for the former farms the main crop should not exceed 75 % of arable land, whereas for the latter farms main crop should not cover more than 75 % of that arable land and the two main crops together should not cover more than 95 % of that arable land. Farms with more than 75 % of total eligible land covered by grassland, and farms with 75% of arable area cultivated with forage are not subject to the crop diversification measure. Under the maintenance of permanent grassland, farms need to maintain permanent grassland on the areas declared as grassland in 2014. The ecological focus area requires farms to set aside at least 5 % of farms’ eligible area (excluding areas under grassland) from the implementation of the reform, with the possibility of increasing this percentage to 7% subject to an evaluation review in 2017. The area that qualifies as ecological focus area includes land left fallow, terraces, landscape features, buffer strips, etc. (Council 2013).

Map 1: Average DP per hectare by MS, 2011 (EUR/ha)

Source: Calculated based on data from European Commission, Eurostat and FADN.

4. IMPACT OF DP ON LAND MARKETS – THEORETICAL AND EMPIRICAL INSIGHTS

KEY FINDINGS

Agricultural policies affect land markets, but the impact depends on the nature of the policies.

Theoretical studies on EU direct payments find that the impact of the DP on land prices depends (among others):

- (for SPS) on the ratio of land entitlements to eligible land,
- (for SPS) on the implementation model (historical vs regional),
- (for SPS) on the tradability of the entitlements,
- on the elasticity of land supply,
- on cross-compliance requirements,
- on land market regulations,
- on credit market constraints,
- on the length of the rental contracts,
- on bargaining power in the land market.

As other agricultural policies in the past, SPS payments have increased land values and rents. However, there is significant variation among regions and among farms. Studies find that between €0.06 and € 0.94 per additional euro of SPS payment is “capitalized in land prices” in the EU-15 -- in other words, each additional euro of SPS leads to an increase of land rents between €0.06 and € 0.94.¹¹ There is stronger capitalization under the hybrid model than under the historical model and low value entitlements are capitalised more than high value entitlements.

NMS land sales and rental prices have increased strongly with the increase in SAPS since accession in 2004. Correlation between the DP and the land prices is very strong in those countries. Studies find that between €0.15 and € 0.32 per additional euro of SAPS payment is capitalized in the land rental price increases in the NMS. There is stronger capitalization of SAPS in more credit constrained markets, and lower capitalization in countries where more land is used by corporate farms, reflecting a strong bargaining position of the farms in the land market.

The distributional effects of agricultural policy, which Alston and James (2002) refer to as the “incidence of agricultural policy”, have been studied extensively in the literature. Previous studies have analyzed how these effects differ among policies (Alston and James 2002; de Gorter and Meilke 1989; Dewbre, Anton and Thompson 2001; Gardner 1983; Guyomard, Mouel and Gohin, 2004), how they affect agents along the vertical supply chain (Desquilbet and Guyomard 2002; Sheldon, Pick, and McCorriston 2001), how they are

¹¹ The capitalization of subsidies refers to what extent the subsidies (e.g. SPS) affect land values (i.e. sale prices and rents). It can be described by several measures, of which the three most important are: (i) *the capitalization level*, which is usually expressed in monetary terms (change in land value in Euro per one Euro of subsidy change), (ii) *the capitalization rate*, which is usually expressed in percentage representing the share of subsidies which are reflected in higher land values and (iii) in the elasticity form (*capitalization elasticity*) expressed as percentage change in land value per one percentage change of subsidy.

influenced by imperfect competition (McCorriston and Sheldon, 1991 and Salhofer and Schmid, 2004), by imperfections in factor markets (Ciaian and Swinnen 2006, 2009), by implementation details (Gardner 2002), or by transaction costs and constraints in the implementation of policies (OECD 2007; de Gorter 1992; Munk 1994; Vatn 2001).¹²

Early studies focused on policies which were coupled to production decisions, e.g. price intervention and production quotas. After the decoupling of policy support in the late 1990s in the US and 2003 in the EU, more recent studies have analyzed the impact of decoupled subsidies (e.g. Chau and de Gorter 2005; de Gorter 2007; Goodwin and Mishra 2006; Hennessy 1998; 2004; Serra *et al.* 2005; Sckokai and Moro 2006; Ciaian, Kancs and Swinnen 2008; Courleux *et al.* 2008; Kilian and Salhofer 2008; Gocht *et al.* 2013).

4.1. Conceptual insights

Given the focus of our report on land market effects of EU direct payments, a set of recent theoretical studies on the efficiency and income distributional impacts of the EU direct payments are particularly important. This includes Ciaian and Swinnen (2006, 2009) on SAPS, and Ciaian, Kancs and Swinnen (2008), Courleux *et al.* (2008), Kilian and Salhofer (2008) on SPS. These studies yield several insights.

Some of the conclusions hold for all DP, others apply only to SPS or SAPS. Note that conceptually the SAPS impact on land markets is equivalent to the regional SPS model with a surplus (infinite) stock of entitlements relative to eligible area. Under both the SAPS and the regional SPS model with surplus stock of entitlements, all eligible land can benefit from the direct payments and both have a uniform per hectare payment. Thus both payment types create similar incentives in the land market.

In summary, the impact of the DP on land prices depends (among others):

- (for SPS) on the ratio of land entitlements to eligible land,
- (for SPS) on the implementation model (historical vs regional),
- (for SPS) on the tradeability of the entitlements,
- on the elasticity of land supply,
- on cross-compliance requirements,
- on land market regulations,
- on credit market constraints,
- on the length of the rental contracts,
- on bargaining power in the land market.

We now explain each of these effects.

- **The impact of the SPS depends on the ratio of the eligible area to the total number of entitlements.** If there are more entitlements ("surplus") than eligible land, then the SPS leads to price increases in land ("is capitalized in land prices"). However, if there are less entitlements ("deficit") than eligible land, then the SPS does not cause increases in land prices ("not capitalized in land values"). The relative scarcity of entitlements is crucial. The intuition is that the more entitlements are allocated to farms (compared to the eligible land), the more farms will compete for the eligible land to activate the entitlements in order to cash the SPS payment. Hence if there are more entitlements than land available ("surplus"), the increased

¹² Important empirical studies measuring the impact of agricultural policies on land markets include Goodwin, Mishra and Ortalo-Magné (2003) and Lence and Mishra (2003).

demand for land will cause land prices to go up. If there are less entitlements ("deficit") than available land, there is no such demand and there will be no pressure on land prices.

Table 4 reports the number of activated entitlements relative to the utilized agricultural area (UAA) for 17 MS in 2010. Despite some inherent problems with the data, the table suggest some structural differences.¹³ In about half of MS reported in the table (mostly in MS with hybrid model), farms activated entitlements which roughly corresponds to the UAA (e.g. Greece, Ireland, Denmark, Germany, Finland, Sweden), whereas in other MS (mostly with historical model) the ratio of activated entitlements to UAA is significantly below one (e.g. Spain, Italy, Malta, France, Portugal). This suggests that there may be important differences in the capitalization rate of the SPS across MS. Theory predicts that capitalization should be stronger in the first group of countries than the second.

- **If SPS payments are capitalized in land values, the share of the payments that is capitalized is larger for smaller payments (endowment values) than for larger.** As farms with high value entitlements compete with farms with low value entitlements, farms owning high value entitlements can afford to pay higher rents, but will only bid up the rent to the maximum that the low value entitlements can (no longer) afford. Therefore, the low value entitlements will determine the SPS capitalization at the margin.
- **Capitalization of SPS in land prices will be stronger in the regional SPS model than the historical SPS model.** The different models are reflected in differences in the SPS entitlements between farms. With the regional model, there is no difference in SPS entitlements among farms, while there may be large differences with the historical model. An implication of the previous point is that the larger the differences between farms in SPS entitlements, the smaller will be the capitalization of the SPS – because the smallest value will determine the level of capitalization. (See Section 6.2 for a more elaborate explanation of this argument.)
- **Capitalization of SPS in land prices will be affected by the tradeability of entitlements under some conditions.** If the eligible area is larger than the total number of entitlements, then with full tradability of entitlements there is no capitalization of the SPS into land values.¹⁴ The more difficult it is to trade entitlements, the more the SPS becomes capitalized into land values. With low tradability, farms are more likely to keep their entitlements (instead of sell them) and to use them to compete for land, which exerts an upward pressure on land prices.

¹³ Note (1) that Table 4 reports only the number of activated entitlements, which is different from the total allocated entitlements. Farmers may also hold additional entitlements, which they may not be able to use due to the unavailability of eligible land and their sale could be potentially constrained by imperfections in entitlement markets and uncertainties related to future CAP changes (Ciaian, Kancs and Swinnen 2010). The data on the amount of these unused entitlements are not available. In principle, the SPS activated should not exceed the UAA, whereas the total allocated entitlements may exceed the UAA. Note that the number of activated areas for SPS may exceed the UAA in the case that farmers receive entitlements on common land (e.g., Greece) or if they receive entitlements with special conditions which are claimed against livestock and do not require land for their activation.

Note (2) that UAA may not exactly correspond to eligible area. According to the European Commission, "eligible land means any agricultural area of the holding, and any area planted with short rotation coppice, that is used for an agricultural activity or, where the area is used as well for non-agricultural activities, predominantly used for agricultural activities" (European Commission 2013).

¹⁴ With surplus entitlements, SPS is capitalized anyway so tradability is less important in this case.

Ciaian, Kanacs and Swinnen (2010) document differences among the EU-15 MS in the restrictions on trading SPS entitlements. EU regulations allow entitlements to be tradable but certain constraints are imposed by the EU. Member states have some flexibility in introducing additional country-specific limitations on entitlement tradability. Spain, Italy and France have the tightest restrictions on entitlement trading.

- **Capitalization of the DP (SAPS and SPS) in land prices is higher when**
 - **the supply of land is less elastic (i.e. when it is difficult to use more land).** In the extreme case, with fixed land supply, the DP gets fully capitalized in land prices, i.e. all the subsidies go to the landowner because the land rent increase equals the subsidy per hectare. (For SPS this result holds only if there are sufficient entitlements). In empirical studies, land supply elasticities are usually found to be rather low, mostly owing to natural constraints.¹⁵
 - **when the substitution between inputs in the production process is more elastic (i.e. when it is easy to use land instead of other inputs).** With area payments, farms have an incentive to substitute other inputs for land, which increases land demand and leads to the capitalization of subsidies into land values. Where there is high elasticity of substitution between land and other inputs, the impact of an area subsidy on land values that is induced will be large.¹⁶
- **Capitalization of the DP (SAPS and SPS) in land prices is lower with cross compliance.** Cross-compliance requirements imply additional costs to land users, which reduce the demand for land and thus the (positive) effects of DP on land rents will be smaller.
- **Capitalization of the DP (SAPS and SPS) in land prices is lower when land prices are regulated.** Land market regulations in the EU-27 vary strongly among member states. Of particular importance for the SPS capitalization are *maximum price regulations*. The potential capitalization of the SPS into land rents will be reduced in the presence of a rental price ceiling as exists, for example, in Belgium, France and the Netherlands. On the other hand, to overcome the rental price regulation (i.e. the maximum price intervention), farmers will have the incentive to pay unofficial payments (bribe) to landowners to prevent the loss of land to competing farms.¹⁷
- **Capitalization of the DP (SAPS and SPS) in land prices is higher when DP reduce credit constraints.** Many farms, in particular in the poorer rural regions of the EU, face credit market constraints. Access to cash payments (DP) may reduce these credit market constraints, either directly, or indirectly through easier access to bank loans.¹⁸ This will increase capitalization of the DP because it increases the demand for land.

¹⁵ For example, based on an extensive literature review, Salhofer (2001) concludes that a plausible range of land supply elasticity for the EU is between 0.1 and 0.4. Similarly, Abler (2001) finds a plausible range between 0.2 and 0.6 for the US, Canada and Mexico.

¹⁶ Based on 32 studies, Salhofer (2001) reports average elasticities of substitution between land and labour of 0.5, between land and capital of 0.2, and between land and variable inputs of 1.4 for Europe. Similar values are reported in Abler (2001) for the US and Canada.

¹⁷ Anecdotal evidence suggests that this indeed happens in countries with strong rental price regulation (Ciaian, Kanacs and Swinnen 2010).

¹⁸ Ciaian and Swinnen (2009) explain how SAPS payments can be used as collateral for working capital in the NMS.

- **(Changes in) capitalization of the DP (SAPS and SPS) in land prices is more gradual with long-term rental contracts.** The length of the rental contracts can vary strongly – and, often because of regulations, varies strongly among MS.¹⁹ With short run contracts (as e.g. in Ireland) average rental price adjustments can occur fast; with long term contracts (as e.g. in Belgium and France) average rental price adjustments will occur more slowly.
- **Capitalization of the DP (SAPS and SPS) in land prices is lower when farms have strong bargaining power vis-à-vis landowners, and vice versa.** There is significant variation within the EU in terms of the size of farms and the amount of land the typical landowner has. For example, in some regions, small farms rent from large landowners; in others (such as East Germany, Slovakia and the Czech Republic) very large farms rent land from families with small and fragmented land plots. Obviously, these variations will affect the outcome of the bargaining on land rents.

Table 4: UAA and SPS activated area in 2010

	SPS activated area (1000 ha)			Ratio of activated area to UAA (%)		
	2007	2009	2011	2007	2009	2011
Belgium	1168	1151	1153	0.85	0.84	0.85
Denmark	2679	2643	2627	0.99	1.00	0.98
Germany	16737	16731	16658	0.99	0.99	1.00
Ireland	4606	4164	-	1.08	0.99	-
Greece	5537	5774	-	1.39	1.51	-
Spain	14959	15368	16445	0.60	0.64	0.68
France	24151	26140	25730	0.82	0.74	0.88
Italy	8116	8235	8551	0.56	0.62	0.66
Luxembourg	124	124	124	0.94	0.95	0.95
Malta	7	6	7	0.70	0.62	0.62
Netherlands	1285	1348	1369	0.68	0.70	0.74
Austria	2721	2696	2680	0.84	0.85	0.93
Portugal	2418	2342	2295	0.66	0.63	0.64
Slovenia	428	444	435	0.86	0.95	0.95
Finland	2304	2288	2277	1.02	1.00	0.99
Sweden	3146	3036	2991	1.01	0.99	0.98
United Kingdom	15294	14867	15151	0.86	0.86	0.88

Source: SPS entitlements: European Commission; UAA used to calculate the ratio of activated area to UAA: Eurostat. If data were not available for a given year, the value from previous year was used.

¹⁹ According to Ciaian, Kanacs and Swinnen (2010), the key determinants of rental contract durations in the EU are social norms (e.g. in Greece), governmental regulations (e.g. there is a minimum of 9 years in Belgium and France, 6 years in the Netherlands and 5 in Spain), and market institutions (e.g. Germany, Italy, Sweden). Moreover, in several countries (e.g. France) even the renewal of rental contracts is regulated.

4.2. Empirical Findings²⁰

Measuring the impact of DP on land markets is often difficult because land prices are influenced by a variety of other factors, such as agricultural prices/farm profits, location, economic growth, other types of farm subsidies, various regulations (such as zoning, rental and sales market restrictions, ...), etc²¹; because adjustments occur only gradually and because there are significant data problems for the measurement and statistical estimations.

These problems are particularly important for the current study. First, there have been significant changes in the agricultural economy (volatile agricultural prices) and in the general economy (economic recession) over the past years. Second, SPS has replaced another agricultural subsidy system (DP linked to actual production activities – which also had an effect on land markets) which complicates measuring the SPS effect. Third, the SPS and SAPS have been implemented relatively recently, which makes the measurement of the effect difficult because of few data points.

A Comparison of DP and Land Prices

It is interesting to look at how land prices in the NMS have evolved with the increase in SAPS in the past decade. There is only one SAPS model and the subsidies that NMS farms received before acceding to the EU was relatively limited (except for Slovenia) so the increase in SAPS over the past decade was not accompanied by a simultaneous strong reduction in other types of subsidies (unlike in the EU-15).

Figures 5 and 6 demonstrate the amount of SAPS payments per hectare and the land rental and sales prices in Poland and Slovakia. Poland and Slovakia are interesting examples since they represented opposite cases of farms and land markets. In Slovakia, farms are typically (very) large and rent most of their land while in Poland farms are typically small family farms who own most of their land. Yet, as Figures 4 and 5 document, in both NMS, land sales and rental prices have increased strongly with the increase in SAPS since accession in 2004.

Between 2000 and 2011, prices for agricultural land increased by 500-700% in **Slovakia**. Land sales and rental prices increased tremendously since EU accession.

The evolution of land sales and rental prices is similar to the evolution of subsidies and in particular to the evolution of SAPS per ha. There is a very strong correlation between the increase in SAPS and land sales prices and an even stronger correlation between SAPS and rental prices. The increase in land rents is strong in Slovakia where the majority of land (89%) is rented and where farmers were facing important credit constraints. The introduction of SAPS improved farmers' access to liquidity and credit as direct payments could be used as collateral. This caused an increase in demand and in land.

According to Slovakian land expert interviews, capitalization of SAPS in land rental prices is more pronounced the more land the landowner possesses. Large landlords have more

²⁰ Ciaian *et al* (2010) give an extensive overview of empirical studies of the impact of various types of agricultural subsidies on land markets. We refer to this study for this elaborate review and background. We focus here on the most relevant insights for our study.

²¹ Land markets are also influenced by social relationships and cultural context (Robinson and Flora, 2003). They influence the type of transaction (e.g. Rainey *et al.*, 2005), the price of the land (Kostov, 2010) and the parties involved in the transaction (Siles *et al.*, 2000).

negotiation power to set the price than small landowners (see also Swinnen *et al.* 2006). These larger landlords increased rents with the introduction of SAPS, while small owners had less power to increase rents. This is particularly important when the tenant is a former cooperative or state farm with a well informed management and with a dominant position in the land rental market. Since in Slovakia landownership is highly fragmented with parcels being very small on average (0.25ha) and owned by several co-owners, the capitalization of SAPS in land rental prices might thus be lower than what theoretic models would predict.

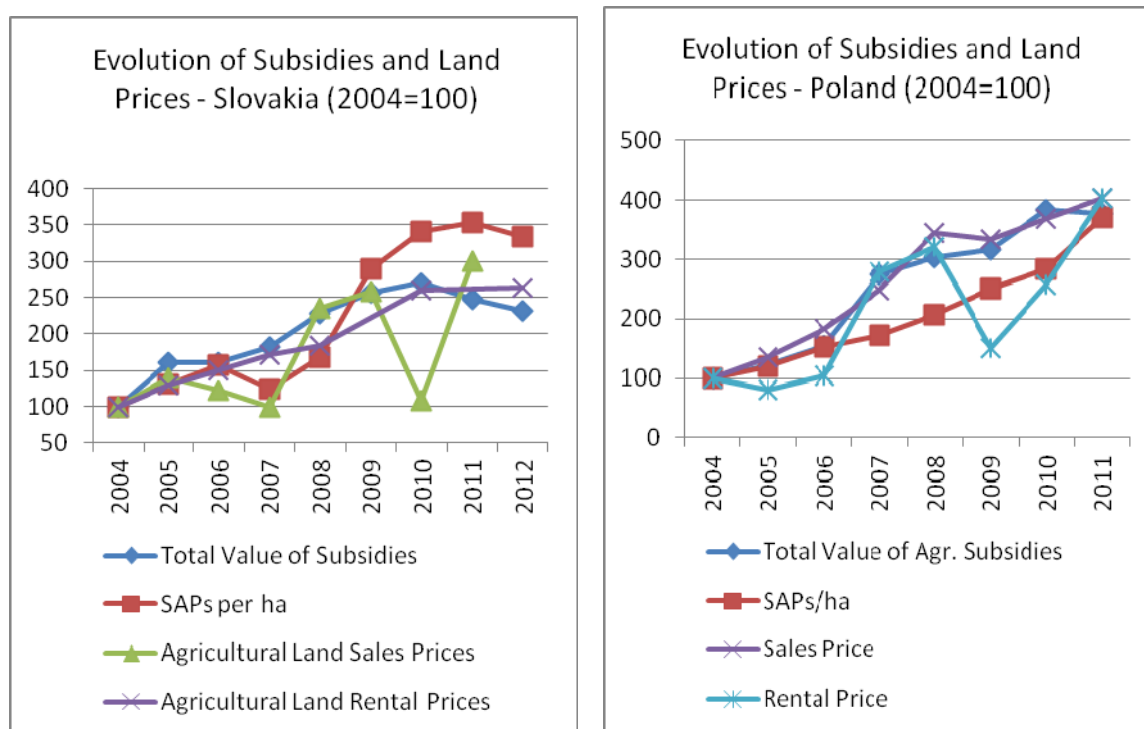
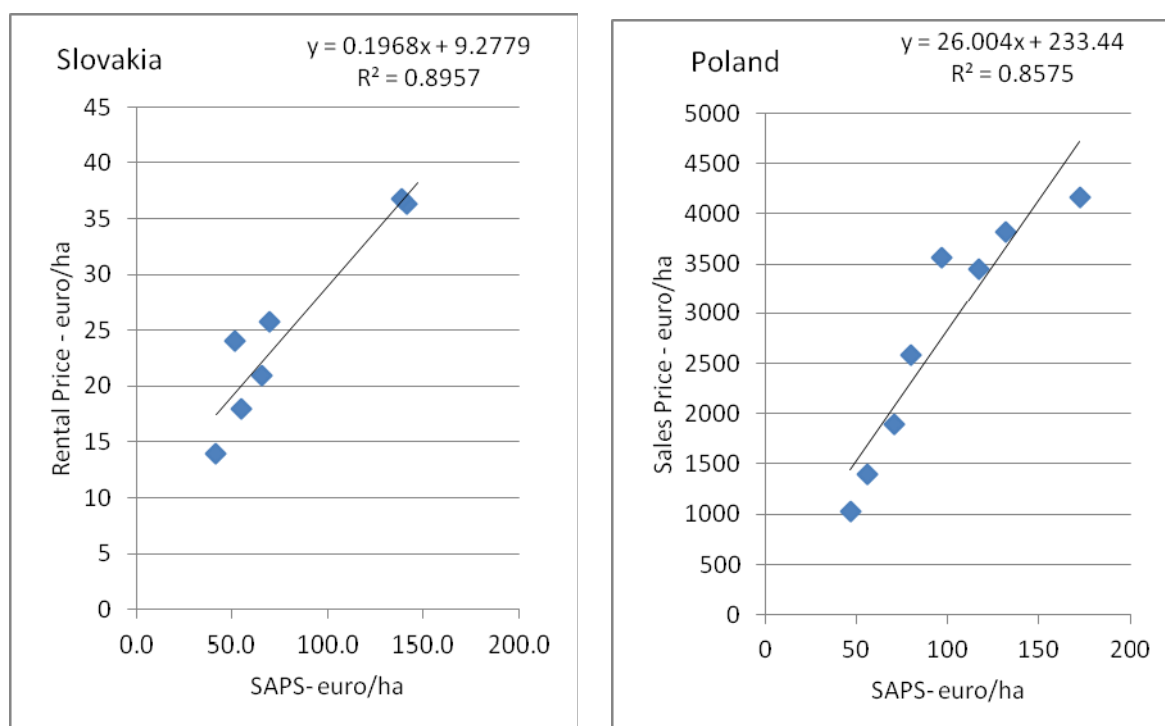
In **Poland**, from the mid-transition period (mid 1990s) till EU accession, prices for agricultural and arable land showed relatively limited increase. However, land prices have increased strongly since 2004. From EU accession till 2012 (eight years after EU accession), sales prices of private agricultural and arable land increased by 315% which corresponds to an average annual increase of 39%. This is a huge increase in a MS where most land is owned by farmers. In comparison, from 1996 till EU accession (eight years preceding EU accession), sales prices of private agricultural land grew by 55% corresponding to an average annual increase of only 7%.

A similar trend can be observed for agricultural land rental prices. From 1997 till 2004, rental prices increased by 75%, corresponding to an average annual increase of 11%, while from EU accession till 2011 rental prices increased by 305% corresponding to an average annual increase of 43%.

Again, there is a strong correlation between direct payments and land prices. SAPS seem to have a stronger correlation with land sales than with land rental prices. This is not surprising as only a minority of land (20%) is rented. Moreover, anecdotal evidence indicates that due to SAPS people are less willing to sell their land because this implies that they lose the direct payments.

Hence, in both countries correlation between the DP and the land prices is very strong – the correlation is more than 85% in both cases.²²

²² Note that in both countries the economic recession has caused a temporary fall in land sales prices (in 2009 in Poland and in 2010 in Slovakia) but with rapid recovery.

Figure 5: Evolution of SAPS and Land Prices in Slovakia and Poland**Figure 6: Correlation of SAPS and Land Prices in Slovakia and Poland**

Econometric Studies

A critique of this simple comparison is of course that land prices are affected by other factors, such as economic growth, crop prices, etc all of which have increased significantly over (at least part of) this period. Hence, one should account for this as well to get a more precise answer²³. That is what econometric studies try to do.²⁴

The Annexes review in detail the econometric studies that analyze the effect of decoupled payments on land markets (a summary is in tables 5 and 6) (Feichtinger and Salhofer 2013). Here we summarize the key findings.

Only two studies have estimated the effect of SPS on land values.²⁵ Kilian and Salhofer (2009) using data from Bavaria (Germany) in 2007, find that SPS payments are strongly capitalized into land values. Johansson and Nilsson (2012) using data from Sweden in 2007 and 2008 also find a high elasticity of SPS payments on land sales prices: one percent increase in the SPS increases land sale price by 0.62%.

More studies focus on land rental prices since data on land rents are more easily available than land values (sales prices). Two studies, using very different datasets, estimated the impact of SAPS payments on land rents in the New Member States (NMS). Ciaian and Kancs (2012) use a dataset of more than 10,000 farms in 7 NMS in 2004 and 2005. Van Herck and Vranken (2013) use country level-data on average land rents and SAPS for 6 NMS over the period 1994-2009. Both studies find remarkably similar results: they find that between €0.15 and €0.32 per additional euro of SAPS payment is capitalized in the land rental price increases. This may appear somewhat surprising given that the large increases in land values in Poland and Slovakia after EU accession, and their correlation with SAPS payments, as illustrated in Figure 5 and 6. This is because other factors (e.g. higher agricultural commodity prices, higher efficiency, better institutions, economic growth, etc) also explain part of the land price increases after EU accession in the NMS.

Kilian *et al.* (2012) analyze capitalization of SPS in land rental prices in 2005 in Bavaria – a region which implements the regional SPS model. They find that 44% to 94% of the direct payments are capitalized into land rental prices. This is similar to pre-2003 DP capitalization rates found in earlier studies on EU (around 40%),²⁶ although Kilian *et al.* (2012) find that decoupling of support increased the capitalization rate by more than 15% in Bavaria.

²³ In empirical studies, a few of these other factors affecting land prices are controlled for. However, none of these studies take all potential drivers of land prices into account. Hence, it is difficult to rank their importance based on empirical work. Therefore, country experts were asked to indicate which drivers are most/least importantly affecting land prices in their country. These subjective judgements regarding the importance of factors affecting land prices are presented in Appendix 5.

²⁴ As all empirical studies, one should carefully interpret the results. In particular, the estimations of the subsidy capitalizations may be influenced by data problems, identification problems due to general equilibrium effects, and self-selection of farms into subsidy schemes (Gardner 2002; Michalek, Ciaian and Kancs 2013).

²⁵ A few earlier studies on land values (sales markets) measure the effects of pre-2003 direct payments and CAP subsidies and find wide variations of elasticities of land values with respect to coupled subsidies. Duvivier, Gaspart and de Frahan (2005) estimate the elasticity of arable farmland prices to direct payments between 0.12 to 0.47 in Belgium over 1993-2001. Pykkönen (2006) finds estimates between 0.20 and 0.60 for Finland over 1995-2002. Latruffe *et al.* (2008) find very high estimates for the Czech Republic before EU accession (1995-2001): in spite of their low level, direct payments have a capitalization rate between 0.61 and 0.89 depending on the type of land.

²⁶ Patton *et al.* (2008) on Northern Ireland from 1994 to 2002 and Breustedt and Habermann (2011) for 2001 in Germany find strong capitalization rates for pre-2003 direct payments: they both estimate that around 40% of DP were capitalized in land rents.

Michalek, Ciaian and Kanacs (2013) estimate the capitalization of the SPS into land rents using farm-level data across the EU-15 for the early period of SPS implementation (2004 to 2007). They find much lower estimates: the average level of capitalization is only 6%. However, Michalek, Ciaian and Kanacs (2013) also show that there is significant variation in capitalization in the EU-15, among regions and among farms. Moreover, the variation is consistent with theoretical predictions on lower capitalization in the **historical compared to the regional model**. The regional model is not widely implemented across MS, and thus the estimation of its capitalization is difficult. However, a comparison of the effect of the hybrid model versus the historical model shows that the hybrid model indeed has a higher capitalization rate than the historical model.

They also find that capitalization is much higher for low levels of SPS than for high levels, which is consistent with theoretical predictions on the historical SPS model: the low SPS levels will determine the level of capitalization (at the margin) – see Section 4.1 above. The capitalization rate varies between 11% and 94% for SPS smaller than 200 €/ha – representing around 43% of land area (and 51% of the farms) in the EU-15. For larger payments (i.e. SPS greater than 200 €/ha) the capitalization rate is below 10%.

This is also consistent with the findings of Johansson and Nilsson (2012) for Sweden and Kilian *et al.* (2012) for Bavaria (Germany). The fact that they find much higher SPS capitalization rates is consistent with (a) the implementation model: Sweden uses the hybrid model and Bavaria the regional model, which are expected to have higher capitalization than historic models; and (b) in both Sweden and Germany the entitlement/UAA ratio is (almost) one (see Table 3), which is also expected to cause higher capitalization.

The estimates also depend on the timing of the effects. As rental contracts are typically for more than one year, the impact on land rents may take some time to materialize. Studies which focus specifically on short-term or new contracts find much higher capitalization rates. For example, Patton *et al.* (2008) in their analysis of Northern Ireland only include farms with rental contracts of one year, and exclude all longer-term rental contracts. They find that the capitalization of land based subsidies is more than 100%. Kilian *et al.* (2012) also find that the SPS capitalization effect is significantly higher for newly signed rental contracts in Bavaria (Germany).

For obvious reasons, land regulations may constrain capitalization. Latruffe and Minviel (2012) confirm that land regulations in France have lower land prices (and constrain their increase).

The empirical estimation of the impact of **cross-compliance costs** is complicated, because their direct measurement is difficult. These costs are linked to farms' decisions on input allocation and production choices. They influence farm activities both directly by impacting the intensity of inputs, farm management practices and production and indirectly through secondary effects on farm productivity.²⁷ That said, Michalek, Ciaian and Kanacs (2013) provide some indirect evidence that cross-compliance costs may indeed reduce the land rents in EU-15. Similarly, both Johansson and Nilsson (2012) in their study on land values in Sweden and Kilian *et al.* (2012) in their study on land rents in Germany find that agro-environmental payments are negatively correlated with land prices, which seems to suggest

²⁷ For example, cross-compliance costs related to environmental requirements are the sum of the direct input use effects (e.g. reduction of fertilizers use) and change in management practices and the indirect productivity effects induced by changes in input use and management practices. For this reason it is difficult to separate them from regular farm practices and quantify their impact on land rents.

that the payments are not sufficient to cover the additional costs associated with cultivating plots eligible for this type of payments.²⁸

Finally, Van Herck and Vranken (2013) in their study of SAPS effects in 6 NMS find empirical support for two additional theoretical predictions, i.e. (a) that there is stronger capitalization of SAPS in more **credit constrained markets**, and (b) that capitalization of SAPS is lower in countries where more land is used by corporate farms, which the authors interpret as reflecting a strong **bargaining position of the farms** in the land market.

Table 5: Estimated impact of decoupled subsidies on farmland prices

Study	Type of subsidy (Country)	Capitalization elasticity (Percentage change in land price per 1% increase in subsidies)	Capitalization level (land price increase per additional subsidy) (\$)	Capitalization rate (the share of subsidy capitalised in land price) (%)	
				r=5%	r=10%
Decoupled subsidies					
Goodwin, Mishra and Ortalo-Magné (2003)	Coupled subsidies (AMTA) (US)		3.7-4.9	19-25	37-49
Goodwin, Mishra and Ortalo-Magné (2005)	Coupled subsidies (AMTA) (US)		3.7-4.9	19-25	37-49
Vyn <i>et al.</i> (2012)	Direct payments (Canada)		4.67-10.02	23-50	50-100
Johansson and Nilsson (2012)	SPS (Sweden)	0.62			
All subsidies					
Barnard <i>et al.</i> (1997)	Direct payments (US)	0.12-0.69			

Note: *The values in these columns are calculated by dividing the estimated effect of subsidies/market return on land price with the net present value of subsidies/market return. If the number is equal to 100% it implies full capitalization of subsidies in land prices. A lower value than 100% implies partial capitalization of subsidies in land prices. *r* is assumed interest rate. AMTA refers to agricultural market transition assistance.

Source: Authors' tabulation based on the respective study data.

²⁸ Note that agro-environmental payments differ to cross-compliance and SPS but the estimates of Kilian *et al.* (2012) indicate that environmental related measures may impact land values. In principle, the agro-environmental payments should not have an impact on land values because by design they are supposed to be calculated on the basis of additional cost incurred or income forgone. However, in reality this may not always be the case as findings of the European Court of Auditors (2011) indicate.

Table 6. Estimated impact of decoupled subsidies on farmland rents

Study	Type of subsidy (Country)	Capitalization rate (the share of subsidy capitalised in land rents) (%)
Decoupled subsidies		
Goodwin, Mishra and Ortalo-Magné (2005)	Coupled subsidies (AMTA) (US)	29
Lence and Mishra (2003)	Coupled subsidies (PFC) (US)	71-86
	Coupled subsidies (MLA) (US)	84-90
Kirwan (2009)	Decoupled payments (US)	25
Kirwan and Roberts (2010)	Decoupled payments (US)	14-24
Goodwin, Mishra and Ortalo-Magné (2011)	Decoupled payments (US)	32-164
Hendricks, Janzen and Dhuyvetter (2012)	Decoupled payments (US, Kansas)	20-57
Kropp and Peckham (2012)	Decoupled payments (US)	32
Patton <i>et al.</i> (2008)	Less favoured area payment (Northern Ireland)	120
Michalek, Ciaian and Kancs (2013)	SPS (EU, OMS)	6-10
Ciaian and Kancs (2012)	SAPS (EU, NMS)	19
Van Herck and Vranken (2013)	SAPS (EU, NMS)	15-32
All direct payments		
Roberts, Kirwan, and Hopkins (2003)	All government payments (PFCs + conservation programs) (US)	34-41
Kirwan (2005)	All government payments (PFCs + conservation programs) (US)	20-40
Kilian <i>et al.</i> (2012)	DP regional part + SPS (Germany, Bavaria)	61-94
	DP historical part + SPS (Germany, Bavaria)	44-54
	Less favoured area payment (Germany, Bavaria)	19-29

Source: Authors' tabulation based on the respective study data.

PFC refers to production flexibility contracts; MLA refers to market loss assistance program; AMTA refers to agricultural market transition assistance.

5. CONCEPTUAL ANALYSIS OF THE DP REFORM EFFECTS ON LAND MARKETS

KEY FINDINGS

If the budget for SAPS in the NMS will increase, this will cause an increase in land prices (and vice versa).

Reductions in the budget for SPS in the EU-15 will induce declines in land prices *if there are sufficient entitlements* (i.e. if allocated entitlements are in surplus relative to the eligible area). If not, there will be no effect on the land market.

The harmonization of SPS within a country/region, when the historical model is replaced by a regional model for entitlement allocation, is likely to increase land rents (thus increase capitalization of DP in land prices).

Reforms such as additional DP for young farmers and disadvantaged areas and DP which are lower beyond a certain farm size, etc. effectively increase differentiation of per hectare DP value. These reforms will likely reduce land prices and capitalization.

The effect of greening on the land market is likely to be a decline in land rents. However, the size of this effect may be small.

If the new entitlement allocation is different from the current allocation, there could be important effects on the land market, depending on the existing capitalization. If there are sufficient entitlements, an increase in entitlements could shift the ratio of entitlements/land to the point that capitalization would occur. A small increase in entitlements could hence have a disproportional effect on land markets as rents increase strongly because of the competition for land which has intensified at the margin.

The benefits of the DP accrue only to those who receive the entitlements in the specific case when (a) SPS are used (not SAPS), **and** (b) there is surplus land compared to the entitlements. However, in other situations it matters less (or not at all) whether farms or landowners receive the entitlements.

To analyse the potential impacts of the CAP reform we use a stylised conceptual framework. The main reason for choosing this approach is that data on the effects of the proposed new CAP instruments are not available and thus standard empirical analyses are not possible. The conceptual framework used in this report is formally developed in the Appendix to this report and is based on the theories of Ciaian and Swinnen (2006), Ciaian, Kancs and Swinnen (2008), Courleux *et al.* (2008) and Kilian and Salhofer (2008).

For didactic purposes, we assume in our conceptual analysis that the entire land is owned by "landowners", who rent the land to "farms". Such a conceptual framework is useful to analyse and explain the effects, but one should carefully interpret the results. As illustrated by Figure 1, many farms in the EU own (at least part) of the land they operate on. Hence, they are both "landowner" and "farm", but this differs strongly between farms and member states (and regions within member states).

In addition, while we do not explicitly model land sales, the results of our analysis are relevant for land sales markets under plausible conditions.²⁹

All this needs to be taken into account when interpreting the results which is what we do in the last section.

We will analyse the expected impact of the (proposed) reforms as outlined in section 4.

5.1. Change in the MS budget for DP spending (Reform I)

There will be a decline in the EU budget for DP spending and, within the reduced overall budget, a reallocation of DP budget from OMS to NMS.³⁰ This means (a) that in most OMS the MS budget will decline for SPS spending and (b) that in the NMS the MS budget may increase or decrease for SAPS spending depending on which effect (overall budget decline vs reallocation) will dominate.

Effect of the change in SAPS budget (NMS)

The effect of the change in SAPS in the NMS will be “disproportionately” reflected in land prices, meaning that much of this change (whether it will increase or decrease) will be captured by changes in land prices, and less as changes in farm incomes. The reason is that the agricultural land supply is relatively inelastic by now also in the NMS. In the extreme case that there is no increase in land use (land supply elasticity is zero), all of the change in SAPS may be captured by changes in land rents.

This is illustrated in Figure 7, where the horizontal axis represents the quantity of land, A , and the vertical axis measures the rental price, r , and the SAPS t per hectare. The aggregate land demand in a region (or MS) is given by the downward sloping curve D . The aggregate land supply is represented by the upward sloping curve S . The equilibrium set of land allocation and land rent without DP (or other types of support) is (A^*, r^*) . With SAPS, the land demand of farms increases and the demand function shifts to D_s with the distance between both functions determined by the level of SAPS ($= t$ in the figure). The new equilibrium is (A_s^*, r_s^*) . The amount of land farmed has increased and the rents have increased. The gains for farms (increase in producer surplus) are represented by area E and the increase of rental payments (gains for landowners) is area B .³¹ A key result is that the steeper the land supply function (meaning the less responsive land use is to price changes), the more the SAPS leads to increased rents, and the less it leads to increased farm income.

Figure 7 illustrates the effects of the introduction of SAPS (from 0 to t). Changes in the level of SAPS (e.g. due to the CAP reform) will have similar effects as the introduction of SAPS. The level of t will change (either going up or going down) and this will change the land rents and land allocation.

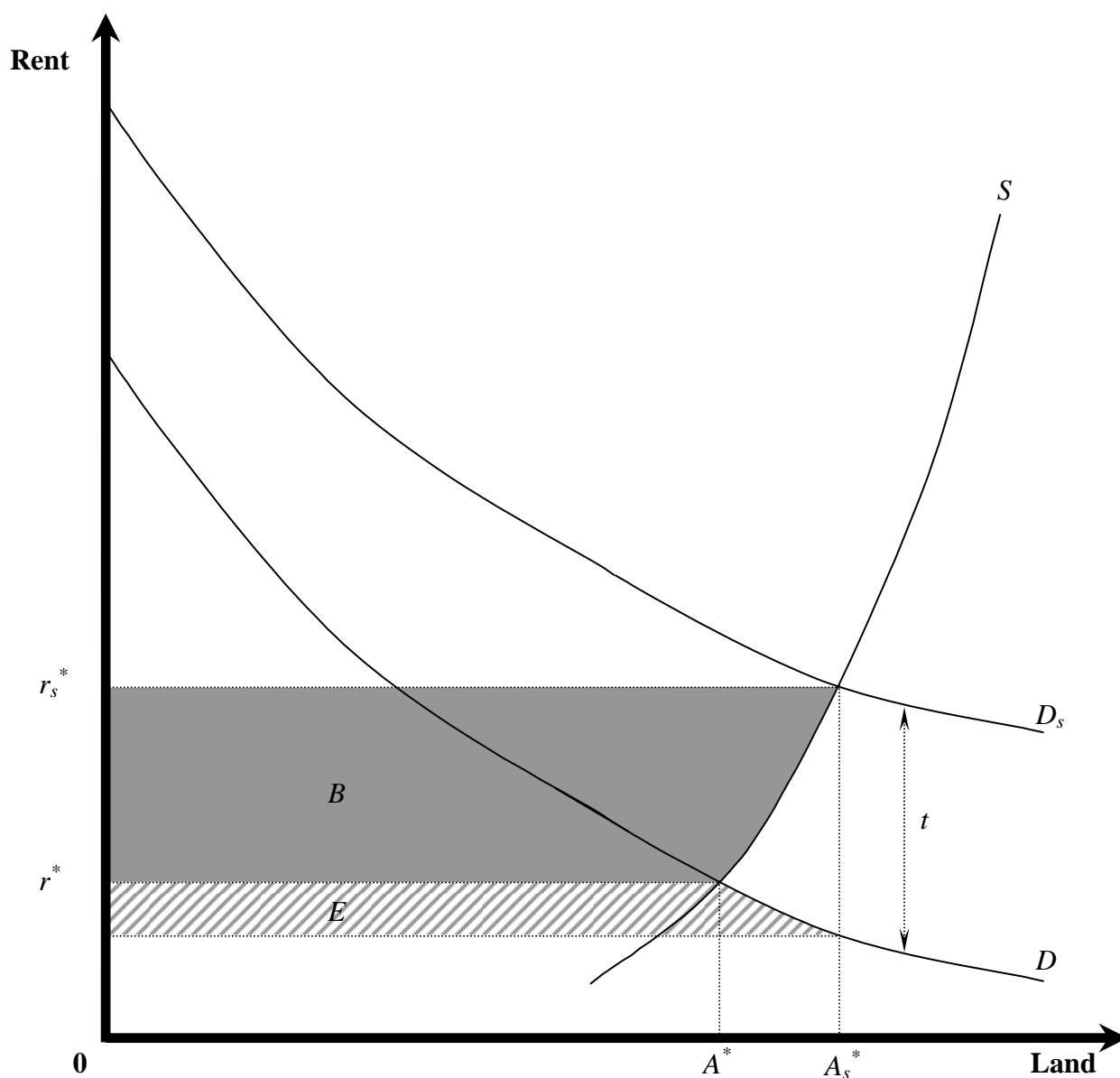
²⁹ Kilian and Salhofer (2008) show that if the sale price of land is assumed to be adequately approximated by the sum of discounted future rental prices, the rental price changes derived in their (and our) analysis are equivalent to sale price changes.

³⁰ A few OMS (e.g. Portugal) may gain depending on the actual size of the budget cut and on the formula used to relocate DP between MS.

³¹ Note that the area B is smaller than the actual change in cash rental receipts given by $r_s^* A_s^* - r^* A^*$. The difference between the two represents the gain to farmers and the additional costs of using new land in cultivation and/or for obtaining payments (e.g. GAEC).

Notice that these results are symmetric, meaning that if DP increase a share of the payment increase goes to increased land rents, and if DP decrease land rents will decline – hence the farm income effect of falling DP will be “compensated” by falling land rents, and only part of this leads to a reduction in farm incomes. How big this part is depends importantly on the land supply elasticity.

Figure 7: The impact of direct payments (SAPS) on the land market



Effect of the change in SPS budget (EU-15)

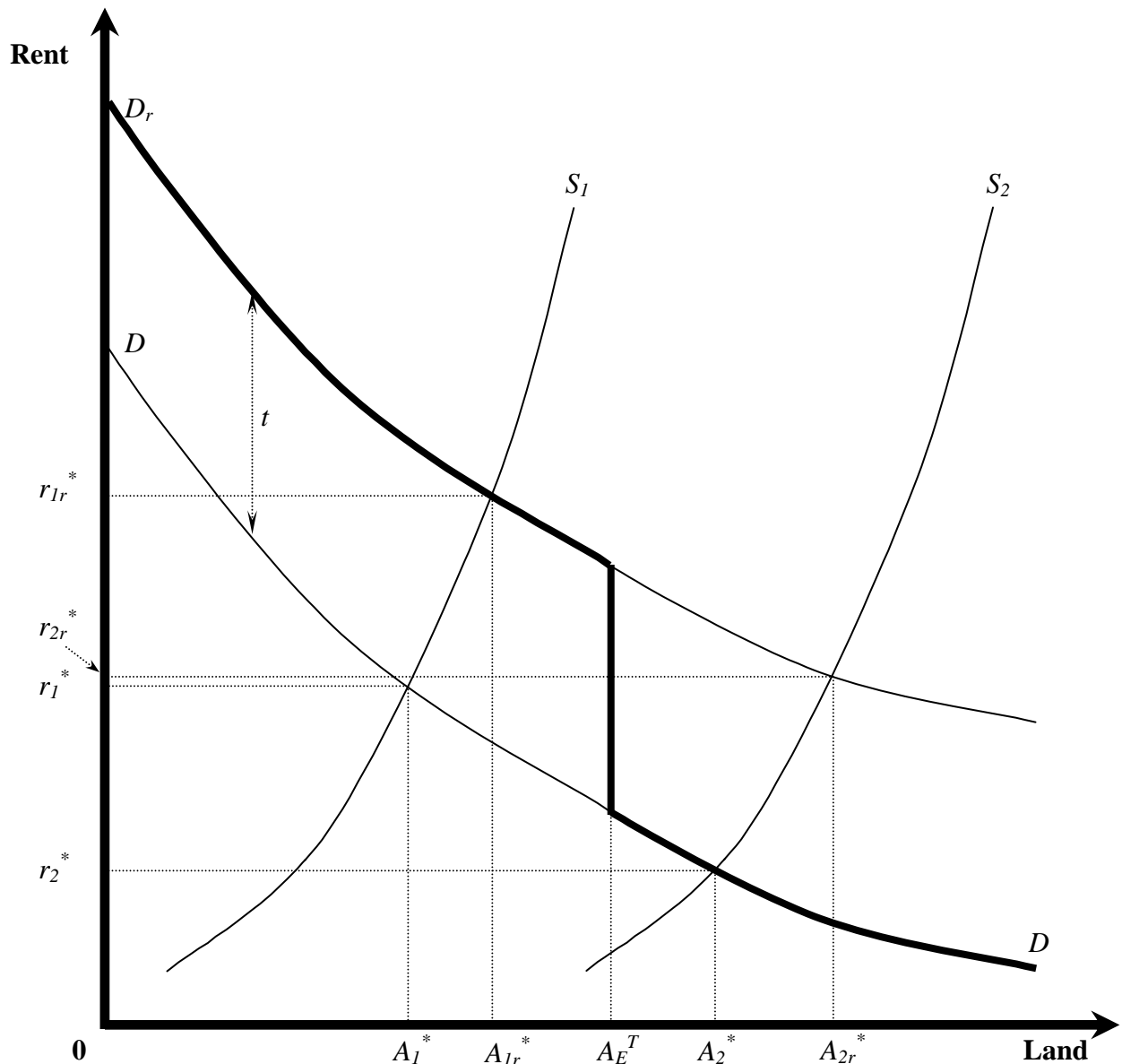
The effect of the decline in the budget for SPS (in the EU-15) will be similar as a decline in SAPS budget (in the NMS) *if there are sufficient entitlements* (i.e. if allocated entitlements are in surplus relative to the eligible area). If not, there will be no effect on the land market.

Figure 8 illustrates these effects of SPS. The left hand side of Figure 8 is identical to Figure 7. However, the shifts in the demand function with SPS will only occur to the extent that there are entitlements available. If the total amount of entitlement is A_E^T (and entitlements can be traded) then the bold line D_r represents the (kinked) demand curve with SPS (with the distance between both functions determined by the level of SPS (= t in the figure)).

We now consider two situations: one MS/region with less land than entitlements (represented by land supply function S_1) and one with more land than entitlements (represented by S_2). As is obvious from Figure 8, the effects of SPS on the land market are very different in the two regions. In region 1, where there is a shortage of land compared to the amount of entitlements, the equilibrium shifts from (A_1^*, r_1^*) to (A_{1r}^*, r_{1r}^*) .³² Competition for land will drive up land rental prices similar as the SAPS effects: there is a strong effect on land rents. However, in region 2, where there is more land available than there are entitlements, there is no impact on the land market. The equilibrium remains at (A_2^*, r_2^*) . Land rents do not change, nor does land use. The SPS payments fully increase farm incomes.

As before, Figure 8 illustrates the effects of the introduction of SPS (from 0 to t). Reductions in the level of SPS will have opposite effects as the introduction of SPS. The level of t will decline and this may change land rents and land allocation, or not, depending on the ratio of entitlements to land rents. In region 1, a decline in SPS will reduce land use and cause a fall in land rents, which will compensate the farm income effects. In region 2, a change in SPS will have no effect on the land market but will more strongly affect farm incomes.

³² Note that we do not exclude the possibility that the marginal land used to activate entitlements might be left uncultivated. The choice between using land in production versus leaving it uncultivated depends on the costs to keep it in good agricultural conditions required by the SPS eligibility (i.e. cross compliance) relative to the costs of using it in production. Implicitly we assume that these costs are equal in our figures. For more detailed analysis on this issue see Courleux *et al.* (2008) and Kilian and Salhofer (2008).

Figure 8: The effect of SPS on land market

5.2. From Historic to Regional SPS (Reform II)

This reform, for obvious reasons, only applies to SPS but not to SAPS.

The harmonization of SPS within a country/region, when the historical model is replaced by a regional model for SPS entitlement allocation, is likely to increase land rents (thus increase capitalization of DP in land prices). The reason is that the land rents (and capitalization of DP) are determined at the margin – as any price is in economics – and demand for land will go up at the margin with regionalisation of the payments.

This is illustrated in Figure 9, which is an extension of Figure 8. In Figure 8 we have the situation of a regional model when all farms get the same SPS. In Figure 9 we introduce heterogeneity among farms in their entitlements – as the historic model does. Consider the

situation that there are two types of farms: Farms 1 with high SPS entitlements (t^1) and Farms 2 with low SPS entitlements (t^2). With tradability of entitlements,³³ farms will first use the high-value entitlements, and then the low value entitlements. This implies a land demand function such as represented by the (double kinked) curve D_h .

To compare the effects of the different models, we keep the total amount (value) of SPS entitlements constant.³⁴ In section 5.1 we have shown that under the regional model, the equilibrium was (A_{1r}^*, r_{1r}^*) in region 1 – where the land was binding and which is the interesting case. Under the historical model the equilibrium in region 1 is (A_{1h}^*, r_{1h}^*) . Hence, land use will increase and land rents will go up with the shift from the historical to the regional model.

In region 2, there is no effect of the harmonization. The SPS had no impact on the land market – this remains the same under the historical model: (A_2^*, r_2^*) remains the equilibrium in region 2. Hence harmonization of payments will not affect the land market in this situation.

These effects are summarized in Table 7.

Table 7: Expected impacts of SPS regionalization on land prices

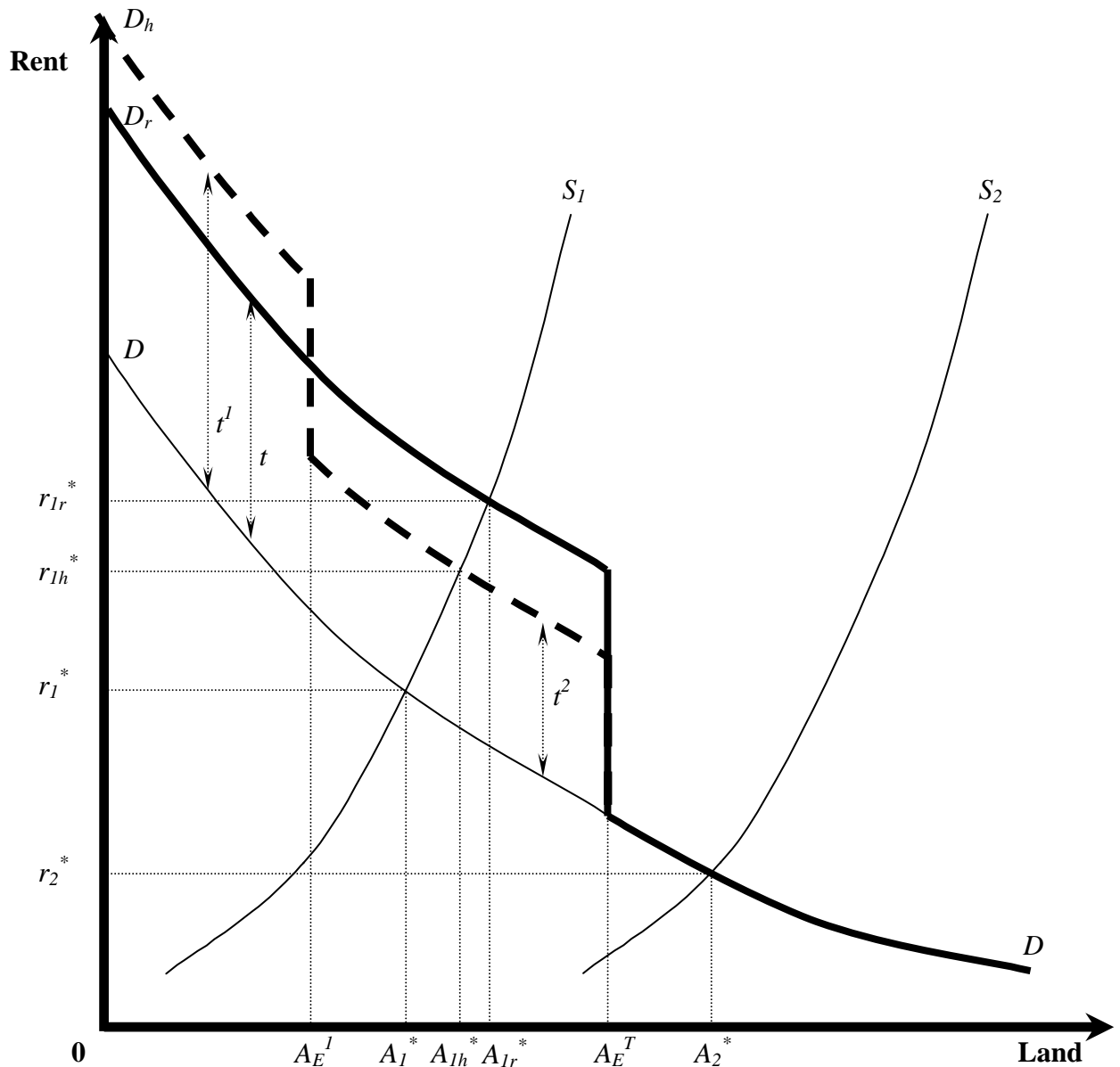
Type of the SPS model (current)	Stock of entitlements relative to land use	Expected impact on land prices/rents
Historical	Surplus	+++
	Deficit	0
Hybrid	Surplus	++
	Deficit	0
Regional	Surplus	0
	Deficit	0

The potential increase of land prices with harmonization is recognized by the Commission's own Impact Assessment accompanying its reform proposals for the post-2013 CAP. It acknowledges that the different models for implementing the SPS had an effect on the degree to which payments were capitalized into land values, noting that "the move to a regional model throughout the EU is likely to increase the rate of capitalization of support in land prices as compared to the historic model" (European Commission, 2011a).

³³ Full tradability of entitlements implies that we can disentangle the entitlements from specific hectare of land or specific entitlement holder. Tradability of entitlements leads to a situation where first most valuable entitlements are exploited and are activated by farms with the highest willingness to pay for land renting and then less valuable ones are exploited. (Ciaian, Kancs and Swinnen 2008; Courleux *et al.* 2008; Kilian and Salhofer 2008).

³⁴ Formally, we assume that $t^* A_E^T = t^1 * A_E^1 + t^2 * A_E^2$, with A_E^1 the entitlements of Farms 1 and A_E^2 the entitlements of Farms 2.

Figure 9: The effect of a shift from historical to regional SPS model on the land market



5.3. Differentiating DP between Farms and Operation Sizes (Reform III)

As explained above, the reform also includes several changes in the DP, which may cause increased differentiation in per hectare DP, such as additional DP for young farmers and disadvantaged areas and DP which are lower beyond a certain farm size, etc – see Reform 3 as listed above. Each of these reform elements effectively increases differentiation of per hectare DP value.³⁵

One can predict the impact of these reforms using the framework we used to compare the historical and regional model – as illustrated by Figure 9.

For a given (fixed) total amount (value) of DP, increased differentiation will have a similar effect as going from the regional to the historic model. By differentiating DP per hectare, it is as if one adds “kinks” to the land demand function. The result is that at the margin the demand is going to be lower than in the case of more harmonized payments. Hence, these reforms will likely reduce land prices and capitalization.³⁶

(Obviously, the size of these effects is likely to differ strongly between regions, because the size of farms and the quality of the land differs strongly between regions and MS.)

5.4. Greening of DP (SAPS & SPS) (Reform IV)

The reformed CAP will impose a stronger linkage of the DP to “agricultural practices beneficial to the climate and environment” (so called ‘*CAP greening*’). The conditions are similar to cross compliance but most likely more demanding than current cross-compliance requirements.

The effect of greening on the land market is likely to be a decline in land rents. An increase in requirements will increase the costs for farms, thus reduce profits from land use and hence reduce demand for land. This, in turn, will lead to a reduction in land use and a decline of land rents.

The size of this effect may be small, depending on the precise conditions for “greening” and how these requirements are implemented (and controlled).

5.5. Reference Period for Entitlement Allocation (SPS) (Reform V)

With the implementation of the 2013 CAP reform, the old entitlements will expire and new entitlement will be allocated to farms. A key factor that will impact income effects is whether the new entitlement allocation will be different from the current allocation. If the new reference period is merely a formal requirement and does not affect the entitlement allocation there will obviously be no effect. However, if the post 2013 entitlements will be influenced by current (or future) land use, then farms (i.e. entitlement applicants) could adjust the amount of new entitlement by adjusting their land use. This would provide an opportunity to entitlement applicants to obtain entitlements for more land than they currently have.

This is not merely a theoretical consideration. In fact, both types of reference periods were applied in the 2003 CAP reform. The number of hectares that generated support in the reference period (i.e. the pre-reform land use) was applied as the base for entitlement allocation in the historical model, while the land used in the first year of the SPS application was used as the base in the hybrid and regional models.

According to the European Council's 2013 consolidated draft proposal (proposal from 12 March 2013),³⁷ entitlements will be allocated to farms who apply for it in 2014.

³⁵ Note that the Health Check of the CAP adopted in 2008 introduced progressive modulation of DP for large farms. This may offset to certain extent the effect of the capping that is considered in the CAP reform proposal.

³⁶ For example, Sahrbacher *et al.* (2012) using the Agricultural Policy Simulator model find for Eastern Germany that DP capping will reduce land rents and that their reduction is stronger than the reduction in payments.

³⁷ <http://register.consilium.europa.eu/pdf/en/13/st07/st07183.en13.pdf>.

Additionally, MS may require farms, among others, to fulfil one of the following conditions: (i) in 2010 or 2011 received DP or complementary national direct payments, (ii) in 2010 or 2011 did not receive DP but produced vegetables, fruits, potatoes or cultivated vineyards or in 2003 under SAPS their area was not in good agricultural conditions (iii) in 2012 or 2013 were allocated SAPS or (iv) in 2012 or 2013 were allocated payment entitlements from the national reserve (European Council 2013). This proposal corresponds to the second system of entitlement allocation in 2003, i.e. based on land use in the first year of the SPS application. The 2013 consolidated draft proposal has implications for the type of applicants that can obtain new entitlements, i.e. only those who had DP prior to 2014 can receive new entitlements. However, the proposal does not restrict the number of new entitlements that an applicant can obtain. Applicants can apply for the number of entitlements equal to their optimal land use (taking into consideration both the economic return from land and the entitlement value).

This could have potentially important effects on the land market, depending on the existing capitalization.

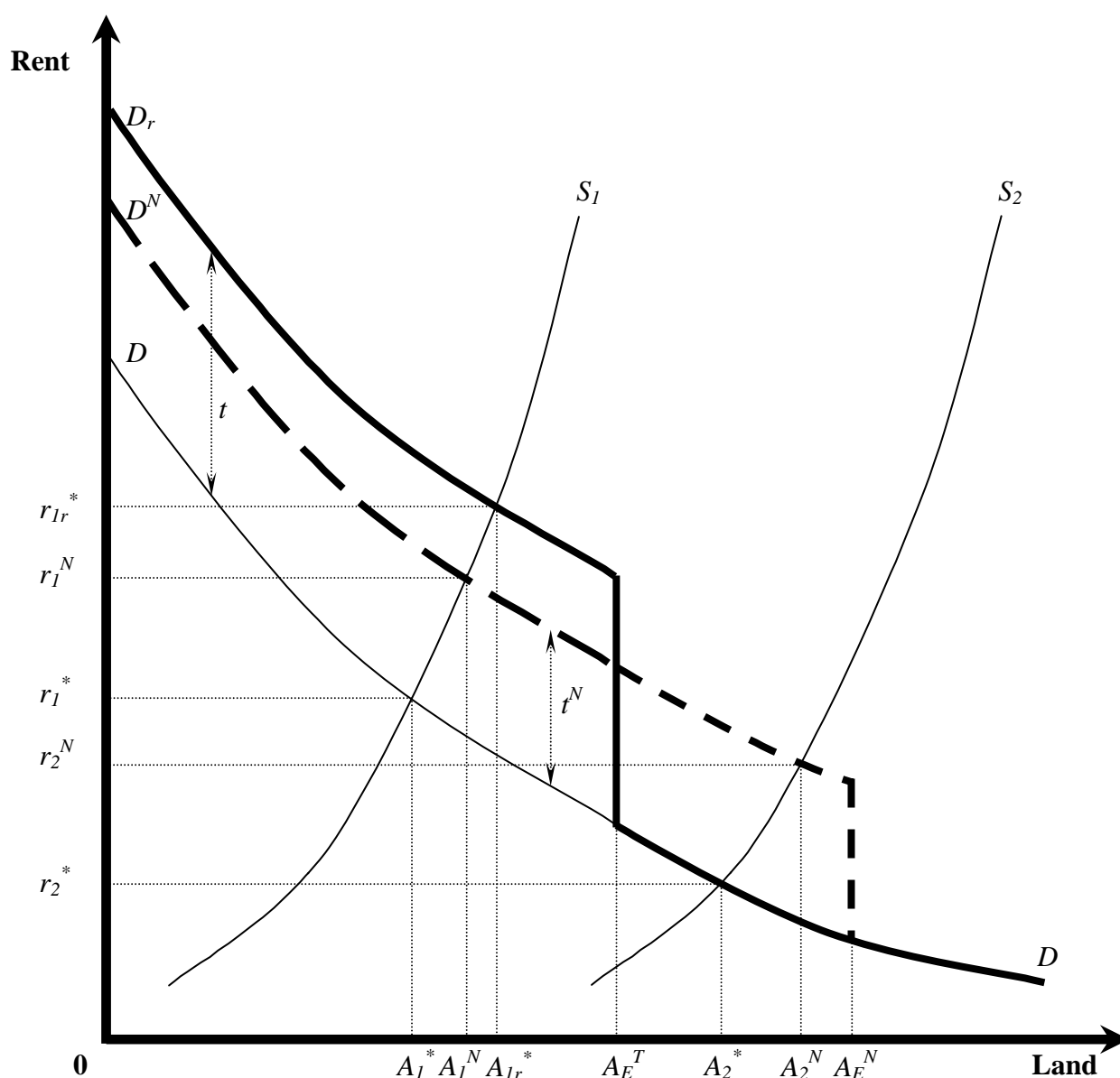
The effects of the two systems of entitlement allocation are shown in Figure 10. We consider the situation before the implementation of the 2013 CAP reform with uniform entitlements t , implying that the land demand is given by D_r and the land market equilibria are (A_{1r}^*, r_{1r}^*) and (A_{2r}^*, r_{2r}^*) in region 1 (represented by land supply curve S_1) and region 2 (represented by land supply curve S_2), respectively.

In a region where there are surplus entitlements in the pre-reform period (like MS 1 in Figure 10), the choice of the reference period may lead to a (small) reduction in land rents. The possibility to obtain new entitlements in the first year of SPS implementation (in 2014 according to the proposal) will incentivise farms to obtain additional entitlements. The size of the increase of entitlements will naturally depend on the availability of land because (as defined in the proposal) farms will be allocated new entitlements only if they are accompanied by an equal amount of eligible land. The European Council's 2013 consolidated draft proposal attempts to limit the increase of the number of entitlements. It stipulates that if the total claims for entitlements in 2014 increase by more than 35% of the total eligible area in 2009, MS may limit the number of payment entitlements to be allocated in 2014 to either 135% or 145% of the total number of eligible hectares in 2009 (European Council 2013). However, because with more entitlements and a fixed budget the per unit entitlement will decline (to t^N in the figure),³⁸ and hence land rents will decline. The land rents decline from r_{1r}^* to r_{1r}^N . This effect is likely small (unless there would be a very large increase in entitlements, which appears unlikely). If the entitlement stock does not change significantly (e.g. due to the land availability constraint or other reasons) the land rental effect will be virtually zero.³⁹

A larger change may occur in a region where there has not been capitalization of SPS (like MS 2 in Figure 10) because the amount of entitlements was less than available land. An increase in entitlements could shift the ratio of entitlements/land to the point that the entitlement constraint is no longer binding and capitalization would occur. This is illustrated in Figure 10. The equilibrium land rents increase from r_{2r}^* to r_{2r}^N . A small increase in entitlements has a disproportional effect on land markets as rents increase strongly because of the competition for land which has intensified at the margin.

³⁸ Visually Figure 10 shows a large increase of entitlements (an increase from A_E^T to A_E^N). However, this is only for illustrative purposes to reduce the complexity of the analysis. However, the results hold in general. In reality the increase in the number of entitlements will be likely smaller than visually apparent on the figure.

³⁹ Naturally if entitlement stock decreases, which is likely less realistic case, the land rents will decline.

Figure 10: The effect of the SPS harmonization between MS

5.6. Eligibility for Entitlements (Reform VI)

Up to now we have assumed that only farms are eligible for the DP. What if landowners receive the payments (SPS or SAPS)?

The analysis of this issue is complex because of several factors. First, it is sometimes difficult to define precisely what is a “farmer” or an “active farmer” or a “farm” or a “landowner”. Second, in some cases “farmers” and “landowners” are the same people/households/organizations. We already pointed this out when discussing the role of renting of land and owning of land by farm(er)s in the first section. Third, some would argue that when discussing the welfare implications of DP on land prices and markets one should explicitly take into account externalities and public good effects and one should

evaluate the welfare effects of capitalization of DP in this perspective. Throughout this report, we do not address the last issue and we use the official EC or EP definitions on (active) farm(er)s and (non-active) landowners when available. Our analysis focuses on how DP and their proposed reforms affect land markets, prices and rents. We do not calculate the broader welfare effects of these land market effects – but do emphasize that an evaluation of the overall welfare effects should take on board these complications as we identify them here.

The past experience has shown that, despite the EU regulations implying that only farms were eligible for SPS entitlements, in several MS implementing the hybrid SPS model also “non-farming landowners” applied for and received entitlements. This was observed in particular in Finland, Sweden and UK (Ciaian, Kanacs and Swinnen 2010). Under the hybrid model, the entitlement allocation was based on land use in the first year of the SPS implementation, implying that anyone who had land could obtain entitlements.

There is also some evidence that “non-farming landowners” have captured the DP (SAPS) in NMS. According to findings of the European Court of Auditors, although rules in Hungary and Romania stipulate that non-farming landowners are not eligible for SAPS, in practice this is rarely enforced. In both countries, SAPS had been paid to landowners who were not active farmers themselves, while the farmers actually using the land had no access to SAPS (European Court of Auditors 2012).

The 2013 CAP reform attempts to prevent ‘non-farming landowners’ from obtaining entitlements by more closely defining the concept of ‘active farmer’. According to the European Parliament proposal, the SPS can be granted only to those farms, whose agricultural land is kept in suitable agricultural conditions with minimum activity carried out on the land. Further, non-farming landowners or natural or legal persons whose agricultural activities form an insignificant share of their overall economic activities or if farming is not their main activity, may also be excluded from receiving DP (European Council 2013).

This specification is generic and whether non-farming landowners will be able to obtain entitlement will depend on the actual implementation and enforcement of this rule. Landowners could try to do this, for example, by adjusting the contractual relation with farms (e.g. by switching to short-term contract farming).

As indicated in the previous section, according to the European Council's 2013 consolidated draft proposal, MS will allocate entitlements to farms who apply for it in 2014 and may impose restriction that only those farms are allocated entitlements who were DP recipients prior to 2014 (European Council 2013). This stipulation complicates the non-farming landowners' access to new entitlements, because it is not sufficient to own land in 2014; it also may require the receipt of DP prior to 2014. However, this stipulation will not prevent those non-farming landowners, who had DP prior to 2014 to obtain new entitlements (e.g. in MS with hybrid model, those landowners who got hold on entitlements through purchase or through other means,⁴⁰ or those landowners benefiting from SAPS prior to 2014).

⁴⁰ For example, in Finland with the SPS introduction, most of the rental contracts were renewed with the modification that entitlements return to the landowner when the rental contract expires (Ciaian, Kanacs and Swinnen 2010).

Does it matter who receives the DP?

From a policy perspective the crucial question is whether it matters who initially owns/receives the entitlements. It is clear from the previous analysis that when farms receive the entitlements part of the benefits (and in some cases all the benefits) may end up with landowners through the induced increase in land rents. What about the other way around? Can farmers also benefit when landowners receive the entitlements? Again, the answer depends strongly on the ratio of entitlements to land supply and on the land supply elasticity.

The benefits of the DP accrue only to those who receive the entitlements in the specific case when (a) SPS are used (not SAPS), and (b) there is surplus land compared to the entitlements. This is the case of region 2 (represented by land supply curve S_2) in Figures 8-9. In this case, whoever gets the SPS entitlements gets the full subsidies since there is no impact on the land markets (the SPS is not capitalized into land rents in this case). This holds for either the regional or historical model. It holds for farmers, and it also holds for landowners if they would receive the SPS entitlements.

However, in other situations it matters less (or not at all) whether farms or landowners receive the entitlements – the effects in terms of land allocation and incomes for farmers and landowners are identical:

- When (a) SPS entitlements are in surplus and (b) there is trade in entitlements and (c) land markets work well, whether landowners or farmers own entitlements does not matter for the effects on incomes, land prices and land use.
- With SAPS payments, if land markets work well, whether landowners or farmers receive the payments does not matter for the effects on incomes, land prices and land use.

The reason is that in order to get the actual subsidies one needs to have both entitlements and the land being used/kept in good condition. Hence **if there are surplus entitlements given to farmers**, farmers will bid up the price of land to farm the land (and get prices for their products) and get direct payments. In this case the DP lead to increased land rents and thus to gains for landowners. Farms gain from the DP but lose because of increased land rents.

If the entitlements are given to landowners, landowners want farmers to farm the land so they (the landowners) can collect the subsidies and the rents. In this case, they are willing to rent the land for lower land rents than their (market) opportunity costs since they will get extra revenue (the DP) if the land is farmed. This will lead to lower land rents, and thus to gains for the farmers – despite the fact that they do not directly benefit from the DP. Landowners gain from the DP but lose because land rents decline.

If trade in entitlements and land markets work well, one can conceptually show that these (opposite) effects on land rents will result in identical outcomes for the land use, and for the income distribution between farms and landowners.

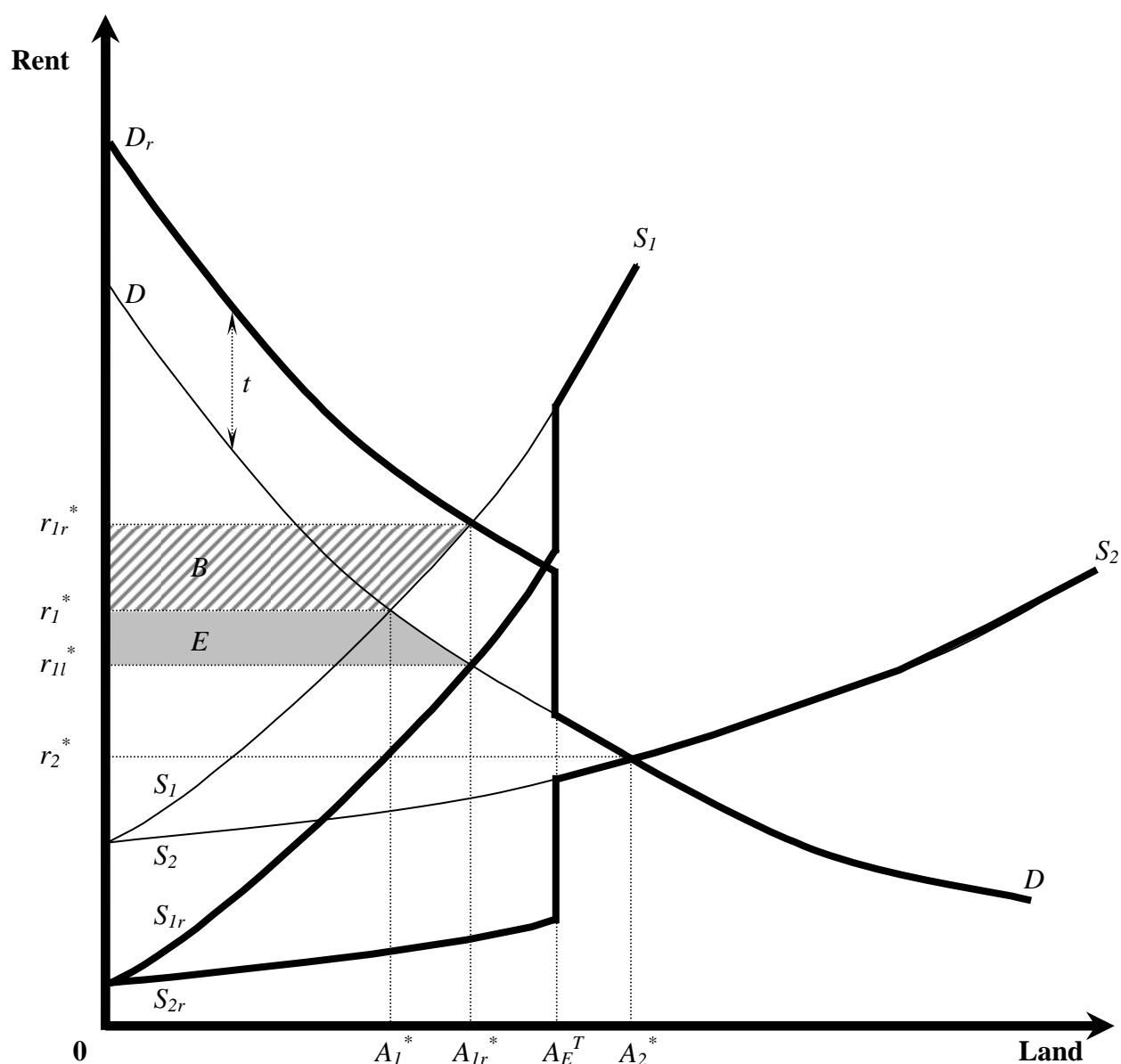
This is illustrated by Figure 11. It compares the results when farms are entitlement owners, with the situation where landowners receive entitlements. To keep the figure simple, we use the scenario of a regional model (with flat-rate SPS as proposed by the 2013 CAP reform to replace the historical and hybrid models) with surplus entitlements. The analysis with SAPS is similar, and yields the same results.

As in Figure 7 when farms are granted payment t , land demand is given by D_r , land supply S_1 and the land market equilibrium is (A_{1r}^*, r_{1r}^*) in a surplus entitlement region (MS 1). If entitlements are granted to landowners⁴¹ instead of farms, then entitlements, t , do not affect the land demand (stays at curve D) but shifts the land supply curve down from S_1 to S_{1r} . The new equilibrium is (A_{1r}^*, r_{1l}^*) . Compared to a situation when farms are entitlement owners, land use is the same. Land rent is lower but the difference in rental rates is equal to the entitlement value, $r_{1r}^* - r_{1l}^* = t$. Hence, entitlement ownership does not affect the income distributional effects. In both cases (farms owning entitlements and landowners owning entitlements) the SPS cause an increase in landowner incomes of area B , and an increase in farm incomes of area E .

While this may seem surprising, the result is not unexpected as it a similar outcome to production subsidies (in closed economies). It is a well known result in the welfare economies of public policies that consumer subsidies and producer subsidies have identical effects (in closed economies with well functioning markets) – see e.g. Gardner (1999).⁴²

⁴¹ Note that in our conceptual model all landowners are non-farming landowners.

⁴² The equivalence of a consumption subsidy and a production subsidy is a standard result in welfare analysis: subsidies for production stimulate an increase in supply, thereby benefiting consumers from a lower consumption price; while subsidies for consumption stimulate an increase in demand, thereby increasing prices, which increases producer incomes. (These results do not hold in an open economy model since prices may be determined on the international markets. However, this matters less for our study since MS farm land is not traded in international markets).

Figure 11: The effect of entitlement ownership

5.7. Total Reform Effects (Summary)

Up to now we have analyzed the effects of each element of the proposed DP reform separately. The different reform elements can reinforce or offset each other. Therefore Tables 8 and 9 provide an overview of the combined effects.

Please note that the indicated size of the effects is mostly indicative and should be interpreted with care as there is insufficient data (and econometric models) to estimate the actual size of the combined effects – hence they should be interpreted with care.

The columns of tables 8 and 9 summarize the impacts of the various reform elements and the rows of the tables organize these effects by different models. The effects effectively summarize the analysis in section 5.

Columns 1-3 use characteristics of the reforms to classify different “models”. More specifically, the models are distinguished by the following factors: (i) the impact of the payment harmonization on the MS budget for DP (column 1), (ii) the current stock of entitlement relative to eligible land (column 2), and (iii) the current SPS model (column 3). The last column lists potential examples of countries which may fit the different models.

The first major observation from considering these tables is the large variety in “models”, reflecting strong heterogeneity in the application of the DP and the reform proposals across the EU-27. In fact, of the 18 potential models, we expect that 13 may actually occur in specific MS.

Columns 5 and 6 summarize the expected impact of the reforms on the MS budget for DP (both aspects of Reform I); column 7 the impact of the move to a flat-rate SPS (Reform II); column 8 the impact of differentiation of the SPS (Reform III); column 9 the impact of the CAP greening (Reform IV); column 10 the impact of the reference period for entitlement allocation (Reform V); and column 11 presents an estimate of the aggregate impact.⁴³

Table 8 presents the expected effects when the base for allocation of the SPS entitlements is the current (pre-2014) entitlement and Table 9 if the base is the first year of implementation. The summarized effects in Table 8 suggest that if entitlements are maintained as they are now, that in the vast majority of cases the overall impact on land prices will be zero or negative, and probably relatively limited.⁴⁴

In MS with deficit entitlements (models 4-6, 10-12 and 16-18) the reforms would slightly reduce capitalization, and thus land prices/rents. This is because the stock of entitlement would not change (i.e. it remains in deficit) so none of the effects will affect the capitalization (except for the greening). With deficit entitlements, the SPS does not affect land markets at the margin implying that the entitlement allocation system (Ref. V), the regionalization (Ref. II), the CAP budget cut (Ref. I), and differentiation of SPS among farms (Ref. III) do not affect the SPS capitalization. However, the CAP greening (Ref. IV) applies to all land and will therefore reduce land prices, irrespective of the entitlement allocation system, but this effect may be quite small.

In MS with surplus entitlements (particularly for models 1-3 and 7-9) the reforms lead to stronger reduction in capitalization. With surplus entitlements, the SPS does affect land markets at the margin implying that additionally to the CAP greening (Ref. IV), the CAP budget cut (Ref. I) and the differentiation of SPS among farms (Ref. III) also reduce the capitalization. And these three effects more than offset the positive impact of moving to a flat-rate SPS (Ref. II).⁴⁵

⁴³ Note that the different reforms presented in table 8 and 9 show the effect on DP capitalization change in the post-reform period relative to the pre-reform period as combined package and not as stand-alone; i.e. the individual effects of each reform element take in consideration the fact that other reform elements are also in place meaning that we consider interaction between different reforms.

⁴⁴ Note that in our analysis we do not assume farm structural change. In reality if significant structural change may occur in the agricultural sector between the reference pre-reform period used for entitlement allocation (e.g. due to being far in the past) and the period of new entitlement allocation, then SPS might be capitalized into land rents in the post-reform period. However, this will occur only if entitlement tradability is constrained. For more on the entitlement tradability and structural change, see Ciaian, Kancs and Swinnen (2008).

⁴⁵ The exception is model 13 where capitalization is expected to slightly increase in the post-reform period. Model 13 represents the situation where MS would gain from harmonization of DP (part of Ref. I) and together with the positive effect of moving to a flat-rate SPS (Ref. II) they more than offsets the negative impacts of the other reforms leading to an overall positive effect. But we do not expect this model to actually apply to a specific MS.

Note that the strongest reduction in capitalization is expected for models 3, 9 and 15. They represent MS with the regional SPS model or SAPS and with surplus entitlements implying relatively strong DP capitalization now. The CAP budget cut (Ref. I), the differentiation of SPS among farms (Ref. III) and the CAP greening (Ref. IV) will reinforce each other in lowering capitalization, and thus land prices. This may apply to some of the NMS despite the DP harmonization between NMS and EU-15.

A comparison between the two tables shows that the choice of the reference period for the SPS entitlement allocation (Reform V) does not matter for 'surplus regions' but may play an important role in 'deficit regions' (models 4-6, 10-12 and 16-18). The entitlement allocation based on the land use in the first year of reform implementation (in Table 9) may turn a region with deficit entitlements into surplus entitlements which may cause a significant increase in land rents/prices due to SPS capitalization. Combined with the move to the flat-rate (Ref. II), the land values may increase - an increase which may not be fully offset by reduced pressure on land values due to the CAP budget cut (Ref. I), the differentiation of SPS among farms (Ref. III) and the CAP greening (Ref. IV).

Table 8: Expected impact of the proposed reforms on land prices when entitlements are maintained at the level of the current (pre-2014) period

MS level effect of harmonization on DP budget	Stock of entitlements relative to land use (current)	Type of the SPS model (current)	Model	Harmonization between MS (Ref. I)	DP budget cuts (Ref. I)	Regionalization (Ref. II)	Differentiation (Ref. III)	CAP 'greening' (Ref. IV)	Reference period (pre-reform entitlement stock) (Ref. V)	Total (net) expected impact	Possible examples of MS
No effect on total DP	Surplus	Historical	1	0	–	+++	–	–	0	0	IE
		Hybrid	2	0	–	++	–	–	0	–	FI, SE
		Regional, SAPS	3	0	–	0	–	–	0	– – –	BG, CZ, HU
	Deficit	Historical	4	0	0	0	0	–	0	–	AT
		Hybrid	5	0	0	0	0	–	0	–	LU
		Regional	6	0	0	0	0	–	0	–	
Reduction in total DP	Surplus	Historical	7	–	–	+++	–	–	0	–	GR
		Hybrid	8	–	–	++	–	–	0	– –	DK, DE
		Regional, SAPS	9	–	–	0	–	–	0	– – – –	CY
	Deficit	Historical	10	0	0	0	0	–	0	–	NL, BE, IT, FR
		Hybrid	11	0	0	0	0	–	0	–	
		Regional	12	0	0	0	0	–	0	–	MT, SI
Increase in total DP	Surplus	Historical	13	+	–	+++	–	–	0	+	
		Hybrid	14	+	–	++	–	–	0	0	
		Regional, SAPS	15	+	–	0	–	–	0	– –	PL, SK, RO, LT, EE, LV
	Deficit	Historical	16	0	0	0	0	–	0	–	ES, PT, UK-ST UK-WL,
		Hybrid	17	0	0	0	0	–	0	–	UK-EN, UK-NI
		Regional	18	0	0	0	0	–	0	–	

Notes: '+' ('–') stands for an increase (decrease) in the SPS capitalization rate; a larger number of plus (minus) signs implies a higher expected increase (decrease) in the capitalization rate.

'0' stands for no change in the SPS capitalization rate.

Country codes: Belgium (BE), Bulgaria (BG), France (FR), Austria (AT), Italy (IT), Poland (PL), Czech Republic (CZ) Cyprus (CY), Portugal (PT), Denmark (DK), Latvia (LV), Romania (RO), Germany (DE), Lithuania (LT), Slovenia (SI), Estonia (EE), Luxembourg (LU), Slovakia (SK), Ireland (IE), Hungary (HU), Finland (FI), Greece (GR), Malta (MT), Sweden (SE), Spain (ES), Netherlands (NL), United Kingdom (UK), England (EN), N. Ireland (NI), Scotland (ST), Wales (WL);

Assumptions on MS categorization: MS with activated entitlements equal or higher (lower) than 98% of UAA where assumed to have surplus (deficit) entitlements; MS implementing SAPS were included in the category of MS with regional model and surplus entitlements. The MS categorization in column 1 is based on European Commission (2011, p. 60).

Table 9: Expected impact of the proposed reforms on land prices with entitlement allocation based on the land use in the first year of reform implementation

MS level effect of harmonization on DP budget	Stock of entitlements relative to land use (current)	Type of the SPS model (current)	Model	Harmonization between MS (Ref. I)	DP budget cuts (Ref. I)	Regionalization (Ref. II)	Differentiation (Ref. III)	CAP 'greening' (Ref. IV)	Reference period (entitlement allocation based on the first year of reform implementation) (Ref. V)	Total (net) expected impact	Possible examples of MS
No effect on total DP	Surplus	Historical	1	0	–	+++	–	–	0	0	IE
		Hybrid	2	0	–	++	–	–	0	–	FI, SE
		Regional, SAPS	3	0	–	0	–	–	0	– – –	BG, CZ, HU
	Deficit	Historical	4	0	–	+++	–	–	+	+	AT
		Hybrid	5	0	–	++	–	–	++	+	LU
		Regional	6	0	–	0	–	–	++++	+	
Reduction in total DP	Surplus	Historical	7	–	–	+++	–	–	0	–	GR
		Hybrid	8	–	–	++	–	–	0	– –	DK, DE
		Regional, SAPS	9	–	–	0	–	–	0	– – – –	CY
	Deficit	Historical	10	–	–	+++	–	–	+	0	NL, BE, IT, FR
		Hybrid	11	–	–	++	–	–	++	0	
		Regional	12	–	–	0	–	–	++++	0	MT, SI
Increase in total DP	Surplus	Historical	13	+	–	+++	–	–	0	+	
		Hybrid	14	+	–	++	–	–	0	0	
		Regional, SAPS	15	+	–	0	–	–	0	– –	PL, SK, RO, LT, EE, LV
	Deficit	Historical	16	+	–	+++	–	–	+	++	ES, PT, UK-ST, UK-WL
		Hybrid	17	+	–	++	–	–	++	++	UK-EN, UK-NI
		Regional	18	+	–	0	–	–	++++	++	

Notes: '+' ('–') stands for an increase (decrease) in the SPS capitalization rate; a larger number of plus (minus) signs implies a higher expected increase (decrease) in the capitalization rate.

'0' stands for no change in the SPS capitalization rate.

Country codes: Belgium (BE), Bulgaria (BG), France (FR), Austria (AT), Italy (IT), Poland (PL), Czech Republic (CZ), Cyprus (CY), Portugal (PT), Denmark (DK), Latvia (LV), Romania (RO), Germany (DE), Lithuania (LT), Slovenia (SI), Estonia (EE), Luxembourg (LU), Slovakia (SK), Ireland (IE), Hungary (HU), Finland (FI), Greece (GR), Malta (MT), Sweden (SE), Spain (ES), Netherlands (NL), United Kingdom (UK), England (EN), N. Ireland (NI), Scotland (ST), Wales (WL);

Assumptions on MS categorization: MS with activated entitlements equal or higher (lower) than 98% of UAA were assumed to have surplus (deficit) entitlements; MS implementing SAPS were included in the category of MS with regional model and surplus entitlements. The MS categorization in column 1 is based on European Commission (2011, p. 60).

6. CONCLUSIONS AND IMPLICATIONS

Measuring the impact of DP on land markets is difficult because land prices are influenced by a variety of other factors, such as agricultural prices/farm profits, location, economic growth, other types of farm subsidies, various regulations (such as zoning, rental and sales market restrictions, ...), etc; because adjustments occur only gradually and because there are significant data problems for the measurement and statistical estimations.

There is significant capitalization of DP (both SAPS and SPS) in the EU, but with strong variation among regions and among farms. The impact of the DP on land prices depends (among others): (for SPS) on the ratio of land entitlements to eligible land, (for SPS) on the implementation model (historical vs regional), (for SPS) on the tradability of the entitlements, on the elasticity of land supply, on cross-compliance requirements, on land market regulations, on credit market constraints, on the length of the rental contracts, on bargaining power in the land market, etc.

The proposed 2013 CAP reform will change both the implementation of the DP and their budget. Some measures like the shift from historical to regional SPS will induce a harmonization of payments across MS and across farms, while other reforms such as the progressive reduction of the DP per farm will cause an increased differentiation in per hectare DP. Other reform issues relate to the linkage of the so called 'CAP greening', the reference period for entitlement allocation and the definition of farms eligible for DP.

Our analysis of the DP reform effects on land markets yields several hypotheses on the effects of the various elements of the reform package. In the previous section we have analysed both the sub-effects and made an attempt to predict the combined effects.

However, the identification of the exact impact of the CAP reform is not a straightforward exercise, because different reform elements may have different effect on DP capitalization. Further, the current DP implementation and capitalisation also plays a role in how the changes to DP will affect future land markets. Therefore the combined effects as identified in Tables 8 and 9 should be interpreted with care. Still, a key result is that the effects are likely to vary significantly among member states. In fact, in our analysis we identify 13 possible "models".

In interpreting the results one should also take into account that land prices are influenced by a variety of factors (including urbanization, economic growth, agricultural prices, government regulations, etc.).

Another important element is that the income effects from the changes in land prices depend also on whether landowners are farmers, and vice versa. Figure 1 shows that the share of land renting in the total UAA in the EU in 2009 varies strongly among MS with an EU-average land renting share of 53%. In MS with much land renting (e.g. Slovakia, Bulgaria, the Czech Republic, France, Malta, Belgium) non-farming landowners are more likely benefit from DP than in MS where most farms own their land (e.g. Ireland, Denmark, Portugal, Poland).

The (empirical and conceptual) analysis provided in this report and summarized above suggests that various implementation elements of the CAP reform influence the impact of DP on land markets. This then also implies that a number of relatively minor policy changes could have substantial impacts on this. Issues that are important in this respect include:

- the amount of the allocated entitlements to farms relative to the eligible area, which is an important determinant of DP capitalization;
- the reference period choice, in particular for regions where there is currently a “deficit” of entitlements. In this case, allowing a substantial increase in entitlements may trigger significant capitalization;
- the differentiation in per hectare DP. The proposed CAP reform provides options to introduce differentiation in per hectare DP in a variety of ways. Such differentiation is likely to reduce capitalization;
- formal and informal land market regulations and institutions may have an important impact on land prices, and thus may enhance or constrain the impact of DP reforms;
- the length of rental contracts may affect the speed with which changes in DP capitalization emerge and are reflected in land prices;
- the eligibility for entitlements (farmers versus landowners) may matter, or not, for the distribution of the income effects. If DP are capitalised in land values, it matters less who receives entitlements. However, if they are not, access to entitlements may matter importantly.

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ANNEX 1: LAND MARKET REGULATIONS

Measures to protect the tenant

Land market regulations aiming to protect the tenant include regulations that impose a minimum rental contract duration, maximum rental prices, automatic rental contract renewal, conditions for rental contract termination and pre-emptive buying right of the tenant.

Maximum rental prices are stipulated in agricultural land legislation in Belgium, France and the Netherlands. Maximum rental prices depend on the agronomic quality (expected marginal productivity) of a plot⁴⁶. In Austria, rental contracts need to be approved by the "Grundverkehrsbehörde" and this authority can disapprove the rental transaction when the rental determined in the contract is 50% higher than the average price in the region.

In several countries, the national legislation stipulates a minimum duration for a rental contract. This is the case in Austria, Belgium, France, Italy, the Netherlands, Portugal, Spain, Slovakia and Slovenia. In many EU countries, rental contracts are automatically renewed⁴⁷. Moreover, in Belgium, France and the Netherlands, the (automatic) extension of a rental contract can only be prevented by the owner under certain specific conditions (e.g. when the owner or a (close) relative wants to use the land him/herself). Otherwise the rental contract is automatically renewed with the previous tenant.

Tenants have a pre-emptive right to buy the land in Belgium, France, Italy, Portugal, Sweden, Hungary, Latvia, Lithuania, Romania and Slovenia.

Measures to protect the (local) owner-cultivator

Land market regulations which aim to protect the owner-cultivator include restrictive conditions on the owner (such as nationality), maximum sales prices, pre-emptive buying rights for neighbouring farmers and maxima on the transacted area.

Restrictions on foreigners to buy (or rent) land are especially important in the EU New Member States (NMS) (Swinnen and Vranken, 2008, 2010). These restrictions were introduced at the moment of EU accession to prevent foreign investors, attracted by low land prices due to the large income differences and poor-functioning rural credit markets. Virtually all NMS have some restrictions but the precise nature differs among countries⁴⁸.

There exist other restrictions than nationality for land owners in Austria, Denmark, Spain, Hungary and Poland. In Austria, new owners of agricultural land should have their residence relatively close to the plot and have a proof of competence in the agricultural

⁴⁶ In Belgium, rental prices are determined by multiplying the cadastral value of the plot and a regional 'tenancy coefficient'. These 'tenancy coefficients' are determined by a commission composed of members of the regional governments and the professional organizations based on the evolution of the agricultural profitability in the region in the past six years (Swinnen *et al.* 2010).

⁴⁷ Land rental contracts in Belgium, France, Italy, the Netherlands, Portugal, Spain, Sweden, Slovakia and Slovenia are *automatically renewed* by the length of the initial contract period. In Austria, Germany, the UK and the Czech Republic, rental contracts are prolonged year by year.

⁴⁸ In Hungary, Poland and Latvia, no company with majority foreign ownership can buy land. In Estonia, Hungary, Latvia, Poland and Slovakia, foreign individuals ("natural persons") are only allowed to buy a plot after renting and farming the plot for at least three years. In Lithuania, foreign natural persons are allowed to buy agricultural land in case they have been staying and farming in the country for at least three years or when they are married to a national citizen. Interestingly, also Greece and Finland restrict foreigners' renting or buying agricultural land in specific regions.

sector (through experience or education). Also in Poland, farmers should have a proof of competence in the agricultural sector (through experience or education). In Hungary, there is a legal obligation for the new owner to cultivate the land. Moreover, in France, Italy, Portugal, Hungary, Latvia and Slovenia, neighbouring farmers have a pre-emptive right to buy in the case a plot of agricultural land is sold.

In none of the countries, there exists a well-defined maximum sales price, but in Austria, France and Poland, the government can interfere in the sales market of agricultural land in case the sales price of agricultural land is considered too high⁴⁹.

There exist size limitations on the amount owned or transacted land in France, Hungary and Lithuania. In France, the SAFER can refuse a transaction if it considers the amount of land that is sold too high. In Hungary, an individual farmer can own and cultivate up to 300ha, while a legal entity (farming company) is not allowed to own any agricultural land and can only cultivate up to 2500ha of (leased) land. In Lithuania, there is an upper limit on the amount of land that can be owned by a natural person or a legal entity (up to 500 ha).

Measures to protect the land owner and prevent fragmentation

Regulations to protect the land owner include minimum rental prices and the maximum duration of a contract. Countries with a maximum duration on rental contracts are Finland, Sweden, Hungary and Poland.⁵⁰ Austria, Czech Republic and France also regulate the minimum rental price.⁵¹

Regulations to prevent land fragmentation include regulations on minimum plot size⁵² and pre-emptive buying rights of the co-owner. Pre-emptive rights for the co-owner to buy land exist in Italy, Portugal, Czech Republic, Hungary, Lithuania, Poland, Slovakia and Slovenia. There exists a legal minimal plot size in six countries: Germany, Bulgaria, Estonia, Lithuania and Slovakia.⁵³

⁴⁹ In Austria, sales transactions need to be approved by a local authority which may block the transaction when the price is considered to be too high and where there is suspicion of "speculation". Similarly in France, all sales transactions of agricultural land need to be authorized by the regional authority, the "Sociétés d'Aménagement Foncier et d'Etablissement Rural" ("SAFER"). The SAFER can disapprove a transaction when there is suspicion of "speculation". In Poland, sales prices of agricultural land are in principle free, but when the sales price of an agricultural plot is "extremely high", a party with a pre-emptive right may ask for a downward correction of the sales price to the local authorities.

⁵⁰ In some countries there are restrictions on the maximum duration of very long rental contracts, but we did not consider these as a measure to protect the owner. For example, in Bulgaria, there exist "Arenda" contracts with maximum duration up to 50 years and in Belgium, there exists "erfpacht" contracts which can have a maximum duration of 99 years.

⁵¹ In Austria, rental contracts need to be approved by the "Grundverkehrsbehörde" and this authority can disapprove the rental transaction when the rental determined in the contract is 50% lower than the average price in the region. In France, there is a legal minimum rental price for all land transactions, which depends on soil quality and location of the plot. In the Czech, there is no legal minimum price for agricultural land, but in case of disputes between the owner and the tenant the government can decide to set the rent at one percent of the "administrative price of the plot".

⁵² The argument is that extreme land fragmentation may constrain agricultural productivity (e.g. Nguyen *et al.* 1996; Wan and Cheng 2001; Rahman and Rahman 2009; Di Falco *et al.* 2009). However, in some cases restrictions on the minimal plot size cause problems in rural land markets. Vranken *et al.* (2011) finds that in Bulgaria in combination with prominent co-ownership, a minimum plot size law has led to inefficient use or even abandonment of agricultural land. A minimum plot size may also constrain poor farm households' investment in agricultural land, especially in the presence of credit constraints and/or high fixed transaction costs. Buckley and Kalarickal (2006) find that in Ethiopia a substantial share of the households is not able to afford a plot of the legal minimum size.

⁵³ In Germany, when a landowner wants to split a plot of one ha, he/she will need to have permission from the local authority. In Bulgaria, the minimum plot size for agricultural land is 0,3 ha. Vineyards and pastures have a minimum plot size of respectively 0,1 ha and 0,2 ha. In Lithuania, the legal minimum plot size is 0,01 ha.

ANNEX 2: EMPIRICAL STUDIES REVIEW

This section reviews previous studies estimating capitalization of decoupled subsidies into land values. The empirical attempts to estimate the impact of agricultural support policies on land values can be regrouped into two broad categories: land price studies and land rent studies. Whereas the former study policy impact on farmland prices, the latter investigate the policy impact on the farmland rental rates. While the (theoretical) explanations, and hence the empirical specification between the two approaches may differ considerably, usually the choice between the two alternatives is determined by data availability: the availability of either land price (typically from regional datasets) or rental data (typically from farm-level surveys) generally determines the choice of the models. The large majority of early have estimated the present value of land as a function of government payments and other explanatory variables. More recent studies, however, tend to use farm level data and estimate the capitalization of subsidies in rental prices.

The land rent studies typically use farm-level variation in government payments and farm revenues to explain variation in farmland rental rates. Land rents may be empirically superior for investigating the effects of domestic support on land value for several reasons. One of the main advantages using the land rental model is that rents are less affected by farmers' expectation about the future effects of subsidies and market returns. Hence, land rents may more precisely reflect the incidence of the contemporaneous marginal subsidy euro and returns (Alston 2007; Kirwan 2009). In contrast, land prices are based upon expectations about the long-run stream of net returns to production and subsidies tied to land (Kirwan 2009). Second, land rental studies typically use farm-level variation in subsidy payments and farm revenues to explain variation in farmland rental rates. This allows controlling for observable covariates and fixed effects when panel data are available (Alston 2007). Third, rental rates are observed in the market while land value is often stated by the owner and therefore subjective (Whitaker 2006). Finally, rental rates are less affected by urban pressures and other non-agricultural factors if contracts are for short periods of time, and may therefore reflect the value of agricultural activity on the land (Whitaker 2006).

Tables 5 and 6 in the main report summarize the findings of previous studies estimating capitalization of decoupled subsidies into land values. The two Tables suggest that most all of the existing studies are on North America (the US and Canada). Only few studies cover decoupled payments in the EU (Patton *et al.* 2008; Michalek, Ciaian and Kancs (2013); Kilian *et al.* 2012; Ciaian and Kancs, 2012; Nilsson and Johansson 2013).

Barnard *et al.* (1997) use pooled cross-sections in order to assess the degree of capitalization. For investigating the effect of public support on farmland prices they adopt an alternative framework to the PVM. Relying on a hedonic price model Barnard *et al.* regress the cropland value on government subsidies. They measure government payments by the county-level averages of the annual amount of direct payments received per acre for twenty U.S. regions. In order to account for possible land conversion, they included proxies for alternative uses of land in their regression. The other explanatory variables they include are agricultural productivity, non-agricultural influence and state-specific institutional environments and others. Barnard *et al.* find that, depending on the region, the elasticity of cropland value to the government subsidies ranges from 0 to 0.69. Based on these results they conclude that the sensibility of farmland value to government support is spatially variable. Two elements can explain this spatial variability; (i) whether or not the dominant crops in a given region are eligible to the support, and (ii) the level of agronomic flexibility of a given region that determines the ability to adjust output in response to changing

government policy. However, Barnard *et al.* fail to account for omitted variables that might determine both subsidies and land values, thereby likely failing to identify a causal relationship.

Goodwin, Mishra and Ortalo-Magné (2003) use farm-level data for 1998-2001 drawn primarily from ARMS to estimate the determinants of farmland values. They estimate the capitalization rate of government payments (PFC payments and disaster-relief payments (which include MLA payments)) into farmland value. They rely on the fact that the formation of land value is based upon expectations about the long-run stream of returns attached to land. To represent the expected payment, Goodwin, Mishra and Ortalo-Magné use a four-year average value of the realized payments at county level. In addition, they augment the canonical NPV framework to account for possible land conversion. Goodwin, Mishra and Ortalo-Magné first consider the aggregation of all support programs into one single category. They show that using the actual realized payment of each farm as proxy of the expected rent gives a coefficient of 5.40. With the county average, they obtain a coefficient of 6.09. In addition, Goodwin, Mishra and Ortalo-Magné estimate program-specific marginal impacts of per acre subsidies on land value that range from USD 2.59 and USD 7.78, depending on the source of the program payment. Assuming a discount rate of 5 percent (10 percent), their results suggest that landowners capture between USD 0.13 and USD 0.39 (USD 0.26 and USD 0.78) of the marginal subsidy dollar in the form of higher land rents, and that this incidence varies by program, i.e., they show that the rate of capitalization of one dollar of payment is program specific. Breaking out the overall measure of government payments into their individual components, they quantify the capitalization rate for each type of support program. Goodwin, Mishra and Ortalo-Magné find that the impact of an additional dollar of PFC payments USD 4.90 per acre, which is statistically significant. They also find that disaster-relief payments have a statistically significant impact on farmland values, with the impact of an additional dollar of payments about USD 4.70 per acre. These results suggest that both PFC and disaster-relief payments are captured at least partially by landowners, and that landowners were anticipating a continuation of payments beyond the life of the FAIR Act. Similar to Barnard *et al.* (1997), Goodwin, Mishra and Ortalo-Magné find that the extent to which support policies affect land value is spatially variable. They also point out that the implied effect of a support instrument on land value differs from year to year. As the authors note, one caveat to their results is that year-to-year fluctuations in government payments may not capture changes in long-run cash flow expectations that drive land values. When the authors modified their model to allow the effects of government payments on land values to differ from one year to another, they found substantial differences in payment impacts across years.

Lence and Mishra (2003) use a behavioral model of profit maximization, to investigate the effect of agricultural policy on land rents. More precisely, they examine the impact of PFC, MLA, and other government payments on cash rents using county-level panel data from the state of Iowa for 1996-2000. Using panel data they are able to control for additional heterogeneity. Their statistical tests for spatial autocorrelation suggest that it is present and significant (i.e. correlation across space in the random factors outside their model that influence cash rents). Unlike most other studies on land values and rents, Lence and Mishra control for spatial autocorrelation. For comparison purposes, when they ran their model assuming no spatial autocorrelation, the impact of an additional dollar of MLA payments on cash rents drops to about USD 0.50 while the point estimate of the impact of an additional dollar of PFC payments becomes greater than USD 1, which is implausible. Lence and Mishra find positive marginal impacts of support payments per acre that range from USD 0.25 to USD 0.86 in additional rent per acre. On average, an additional dollar of PFC or MLA payments leads to an estimated increase in cash rents of approximately USD 0.85. These

results indicate that landowners capture most of the benefits from PFC and MLA payments. However, in one specification the estimated impact of LDP on cash rents was negative and statistically significant, which raise concerns of misspecification and/or data problems.

Roberts, Kirwan and Hopkins (2003) use 1992 and 1997 farm-level panel data from the US Census of Agriculture with a sample size of about 60 000 farmers. Similar to Lence and Mishra (2003), as a conceptual framework Roberts, Kirwan and Hopkins use a behavioral model of profit maximization. In their model, they divide land rent into two components: variable profits (revenues net of variable costs), and government payments. In their estimations Roberts, Kirwan and Hopkins lump all government payments together into one single variable. Their calculations for 1997 suggest that approximately USD 6.1 billion of the total payments to farmers were derived from Production Flexibility Contracts (PFCs) and the balance of USD 1.7 billion was associated with conservation programs. The most statistically robust estimates of Roberts, Kirwan and Hopkins (2003) suggest an increase in cash land rents of between USD 0.34 and USD 0.41 per acre for each additional dollar of government payments.

Patton *et al.* (2008) consider the case of coupled and decoupled European Union livestock program payments and less favoured area payment on agricultural land rents in Northern Ireland. Their dataset is unique in that rental rates are set on an annual basis due to special legislation that restricts the length of tenure in Northern Ireland. They use lagged values of market revenues and coupled government subsidies as instruments to remove bias from expectation errors. Patton *et al.* (2008) argue that lagged values are valid instruments since they are part of the farmer's information set when rental rates are determined while clearly the expectation error is not part of the information set. They find a rate of incidence of approximately 120% for less favoured area payment and 40% for the two main livestock direct payment programs that they consider.

Kirwan (2009) is probably the most comprehensive incidence study to date in terms of the data econometric identification. Kirwan creates a two year panel of nearly 60,000 farms from the 1992 and 1997 U.S. Census of Agriculture. He uses subsidy levels from a year in which producers only received direct payments to instrument for a payment difference that is subject to expectation error. Kirwan recognizes the problem of inertia and uses alternative datasets to estimate the incidence over two years and nine years. He finds a subsidy incidence of about 25% on rental rates. The dependent variable in Kirwan (2009), cash rent payments divided by total rented acres, is measured with error for farms that also lease on a crop share basis. Kirwan concludes the bias is small and positive by using an external dataset to regress the measurement error on government payments. However, the external dataset is only for a single year. If the number of share leases decreased (increasing the dependent variable) and government payments decreased from 1992 to 1997, then his estimate will be biased downward.

Kirwan and Roberts (2010) estimate the impact of decoupled subsidies on rental prices by using field-level data and explicitly controlling for potentially confounding variables. In particular, using data at the appropriate level of aggregation and explicitly controlling for each field's fundamental productivity, they are able to overcome omitted variable bias. Kirwan and Roberts (2010) explicitly control for the farmland's underlying productivity by using farmers' self-reported expected productivity of the field. Kirwan and Roberts (2010) find that landowners only capture between 14–24 cents of the marginal subsidy dollar. The duration of the rental arrangement has a substantial effect on the incidence. Initially, landowners extract 44 cents of the marginal subsidy dollar, but the incidence falls by 1.5 cents with each additional year of the rental arrangement. This duration effect reveals that

rental market frictions play an important role in the farmland rental market.

Goodwin, Mishra and Ortalo-Magné (2011) place considerable emphasis on the impacts that different government program payments have on farmland rental rates. They use a pooled cross-section of observed farms from the USDA ARMS survey. Goodwin, Mishra and Ortalo-Magné (2011) utilizes three distinct approaches to modeling policy effects on land values and rental rates. The first simply considers the effect of farm-level, realized payments on farm-level land values and rental rates. A second approach constructs explicit measures of expected policy benefits by considering an average of historical county-level aggregates. A third approach adopts an instrumental variables model in which the aggregate measures of policy benefits are used to form instruments that represent expected payments in a generalized method of moments (GMM) context. Goodwin, Mishra and Ortalo-Magné (2011) compare proxy and instrumental variables methods to remove expectations bias. As a proxy variable for expected payments they use a four-year average of per-acre payments in the county. They use lagged payments, future prices, and lagged county-level returns as instruments. Their use of external instruments may be problematic; futures prices are unlikely to make good instruments because they are likely to be correlated with the expectation error in returns and in government payments. Goodwin, Mishra, and Ortalo-Magne (2011) do have the considerable advantage of being able to assess cash rents and share rents separately. This allows a unique analysis in which Goodwin, Mishra and Ortalo-Magné (2011) test whether landowners who lease on a share basis are able to extract additional benefits through higher share rates." Goodwin, Mishra and Ortalo-Magné (2011) find that for each USD 1 of government payments (pooled all program types), landowners claim in benefits USD 0.32 (using actual observed farm-level payments), and USD 0.73-1.64 (using historical average payments), depending on the subsidy program and the tenancy arrangement.

Michalek, Ciaian and Kancs (2013) estimate the capitalization of the SPS into land rents using farm-level data across the EU-15 for the early period of SPS implementation (2004 to 2007). They find much lower estimates: the average level of capitalization is only 6%. Michalek, Ciaian and Kancs (2013) also show that there is significant variation in capitalization in the EU-15, among regions and among farms. Moreover, the variation is consistent with theoretical predictions on lower capitalization in the historical compared to the regional model. The regional model is not widely implemented across MS, and thus the estimation of its capitalization is difficult. However, a comparison of the effect of the hybrid model versus the historical model shows that the hybrid model indeed has higher capitalization rate than the historical model. They also find that capitalization is much higher for low levels of SPS than for high levels, which is consistent with theoretical predictions on the historical SPS model: the low SPS levels will determine the level of capitalization (at the margin). The capitalization rate varies between 12% and 58% for SPS smaller than 200 €/ha -- representing around 50% of land area (and 86% of the farms) in the EU-15. For larger payments (i.e. SPS greater than 200 €/ha) the capitalization rate is below 10%.

Hendricks, Janzen and Dhuyvetter (2012) examine the relationship between government subsidy payments and farmland rental rates. The incidence is estimated with Kansas farm-level panel data from 1990 to 2008 using a differenced generalized method of moments estimator. Hendricks, Janzen and Dhuyvetter (2012) use lagged realizations of the variables as instruments to correct for expectation errors in government payments, revenues and costs. They find a There is substantial inertia in the rental market as evidenced by a large coefficient on the lagged rental rate. Hendricks, Janzen and Dhuyvetter (2012) find that government payments are capitalized into rental rates at about

the same rate as revenue and costs. In the short run another USD 1 of government payments increased rents by USD0.20 and in the long run it increased rents by USD 0.57. However, the standard errors of long run incidence estimates are rather large.

Kropp and Peckham (2012) estimate that decoupled payments have large impact on farmland values; an additional dollar of decoupled payments per-acre tends to increase farmland values by approximately USD 22 per-acre. This suggests a capitalization rate of approximately 4.5 percent. Using rental price data Kropp and Peckham (2012) find that an additional dollar of government payments per-acre tends to increase rental rates by approximately USD 0.32 per-acre. The recipients of government payments (farms) pass on approximately 80 percent of the payment to the landowner in the form of higher rental payments.

Vyn *et al.* (2012) estimate that an additional dollar per acre of government payments increases farmland values by USD 7.87/acre. The estimated elasticity for government payments in Vyn *et al.* (2012) is 0.13, which is lower than previous estimates across other studies on North America.

Ciaian and Kanacs (2012) investigate the impact of the SAPS (Simplified Area Payment Scheme) on rental land prices in seven New EU Member States (NMS). Using the FADN farm level panel data with 20,930 observations from 2004 and 2005 they are able to control for unobserved heterogeneity, simultaneity, and omitted variable bias, which often distort the incidence measures. According to Ciaian and Kanacs (2012), the SAPS has a positive and statistically significant impact on land rents in the NMS, i.e. land rents capture around 0.19 of the marginal Euro of the SAPS. Taking into account the level of land renting in the NMS, around 10 percent of the total value of SAPS payments benefit non-farming land owners through higher farmland rental prices.

Kilian *et al.* (2012) analyze capitalization of subsidies in land rental prices in 2005 in Bavaria – a region which implements the regional SPS model. They find that 28% (historical) to 78% (regional) of the direct payments are capitalized into land rental prices, i.e. 1 additional Euro of direct payments would increase rental prices by 28 to 78 Cents. Kilian *et al.* (2012) also evaluated if introduction of the SPS had any influence on the capitalization rate. They found that the capitalization rate to be higher after the reform. Additional 15 to 19 Cents are capitalized into rental prices, leading to a total capitalization of 44-94%.

Nilsson and Johansson (2013) analyze determinants of agricultural land prices in Sweden with a particular focus on location-specific factors. An asset-pricing model is used to decompose agricultural land prices into expected returns from land in its current agricultural use and expected returns from its potential use. The model is estimated in a cross regional context where explanatory factors relate to regional variations in land productivity, agricultural support payments and urbanizing influences. Nilsson and Johansson (2013) estimate the elasticity of the SPS at 0.54, indicating that doubling of this subsidy would increase land prices by about 54 per cent.

The empirical findings from the studies on land capitalization of agricultural subsidies can be summarized as follows (see Table 5 and 6 in the main report): (i) Landowners benefit from decoupled subsidies. (ii) Land capitalization of decoupled subsidies varies between 6% and more than 100%. (iii) Large variation in the estimated capitalization rate between different studies does not allow to reject the theoretical hypothesis of subsidy capitalization.

The large variation in the estimated capitalization rate between different studies can be explained by data limitations and econometric estimation problems. First, a common weakness of the literature is the inability to identify the effect of subsidies. This identification problem arises from estimating a fundamentally unidentified system. Many unknowns characterize the standard workhorse model of farmland value determination: the present value model. The unknowns of greatest concern are the expected subsidy stream, the discount rate, and the proportion of the subsidy that becomes capitalized into the land value, i.e., the incidence. The present value model, however, is a single equation. As a system, the present value model of land price determination is under-identified (Kirwan and Roberts 2010). No parameter of this system can be identified without further information or restriction on the other unknown parameters. Second, many farmland rental agreements set rental rates over multiple years. Government policy changes that affect subsidy levels do not immediately cause farmers and landowners to adjust rates. This inertia in setting rental rates may lead to significant differences between the short-run and long-run incidence of a subsidy dollar. Third, rental rates are generally set prior to planting and based, in theory, on expectations of market revenue and government payments, as mentioned above. The data on farm profitability and government payments used in econometric estimation of subsidy incidence are observed after output is harvested and sold. This creates errors-in-variables and attenuation bias. Fourth, tenancy arrangements may vary greatly from farmer to farmer and landowner to landowner. Many rental agreements contain some provision for crop sharing. In these cases, the incidence of the subsidy payment may be a parameter of the rental agreement. If crop share rented acres cannot be distinguished from cash rented acres at the farm level, measures of rental rates may be biased and this bias may vary significantly across farms or regions. Fifth, in a given region rents of all farms (including those that do not receive subsidies) are affected by subsidies (general equilibrium effect). The capitalization is a result of competitive pressures among farms, where the land market equilibrium is reached by adjustment in land use and land rental price. Land use adjustment to subsidies is a farm-specific effect, reflecting variation in farm productivity (land demand elasticity) and entitlement allocation across farms. Land rents adjust equally to all farms in absolute terms, and the size depends on the subsidy impact on marginal returns to land.

ANNEX 3: THEORETICAL MODEL

The conceptual framework and model of the present study builds on Ciaian, Kanacs and Swinnen (2008), Courleux *et al.* (2008) and Kilian and Salhofer (2008) who model the previous 2003 CAP reform. All three studies capture the SPS heterogeneity. Whereas the former assumes fixed land supply, the latter two consider upward sloping land supply. Similarly to Ciaian, Kanacs and Swinnen (2008) and Courleux *et al.* (2008) we assume that:⁵⁴ (i) output and variable input equilibrium prices are exogenous; and (ii) the entire land is owned by landowners, who rent it to farms. The results of this model can be extended to land sales markets if the sale price of land is assumed to be adequately approximated by the sum of discounted future rental prices. Kilian and Salhofer (2008) show that under these conditions, the rental price changes derived in the paper are equivalent to sale price changes.

The land market is illustrated in Figure A1. The horizontal axis shows the quantity of land, A , the vertical axis measures the rental price, r , and the DP, t . The aggregate land demand is given by the downward sloping curve D . The aggregate land supply is represented by the upward sloping curve S . The equilibrium set of land allocation and land rent in zero support regime is (A^*, r^*) .

Under the SPS, farms are allocated a certain number of entitlements, the value of which may vary depending on the SPS implementation. To simplify the exposition, we assume two types of entitlements: the stock of type 1 entitlements, A_E^1 , has unit face value t^1 , and the stock of type 2 entitlements, A_E^2 , has face value t^2 . The aggregate stock of entitlements, A_E^T , is the sum of the two types, i.e. $A_E^1 + A_E^2 = A_E^T$. For example, this may correspond to a modeling framework with two representative farms, as assumed in Ciaian, Kanacs and Swinnen (2008), where farm 1 owns type 1 entitlements and farm 2 owns type 2 entitlements.⁵⁵ We assume that entitlements are fully tradable.⁵⁶

The land market with the SPS is shown in Figure A2. To begin with, assume that both types of entitlements have an equal face value, $t = t^1 = t^2$. The land demand with the entitlement face value t can be represented by the bold dotted kinked curve D_r . Relative to the no-support regime, the land demand with SPS shifts upward from D to D_r . Given that farms need land to activate their entitlements and cash-in the SPS, farms' willingness to pay for land increases by the value of entitlement, t . This holds until all entitlements are exhausted, i.e. up to A_E^T . After this point, the land demand is the same with and without the SPS, as there are no unused entitlements available.

Differentiation in the face value of entitlements changes the shape of land demand curve. Assume that entitlement face values are $t^1 \neq t^2$. The land demand with t^1 and t^2 is given by the bold double kinked curve D_h . Because we assume full tradability of entitlements, farms will first use the high-value entitlements, and then the low value entitlements. In Figure A2

⁵⁴ The two simplifying assumptions facilitate to illustrate the effects, but do not alter general conclusions of our analysis. Important is to note that if the sales price of land is assumed to be adequately approximated by the sum of discounted future rental prices, as considered in Kilian and Salhofer (2008), then the rental price changes derived in the paper are equivalent to sale price changes.

⁵⁵ Alternatively this may correspond to a situation of one representative farm which owns both types of entitlements.

⁵⁶ This assumption implies that entitlement ownership does not matter with respect to which farms own them; they will always end up with farms with highest willingness to pay for them (for more details on entitlement tradability see Ciaian, Kanacs and Swinnen 2008).

we assume that the high-value entitlements are of type 1, whereas the low-value entitlements are of type 2, i.e. $t^1 > t^2$. Relative to no-support regime, the SPS shifts land demand by t^1 up to A_E^1 , where all high value entitlements are activated. In the interval from A_E^1 to A_E^T (where $A_E^T - A_E^1 = A_E^2$) it is higher by t^2 , and it is the same after all entitlements are activated, after $A_E^T (=A_E^1 + A_E^2)$.

Figure A1: Land market without DP

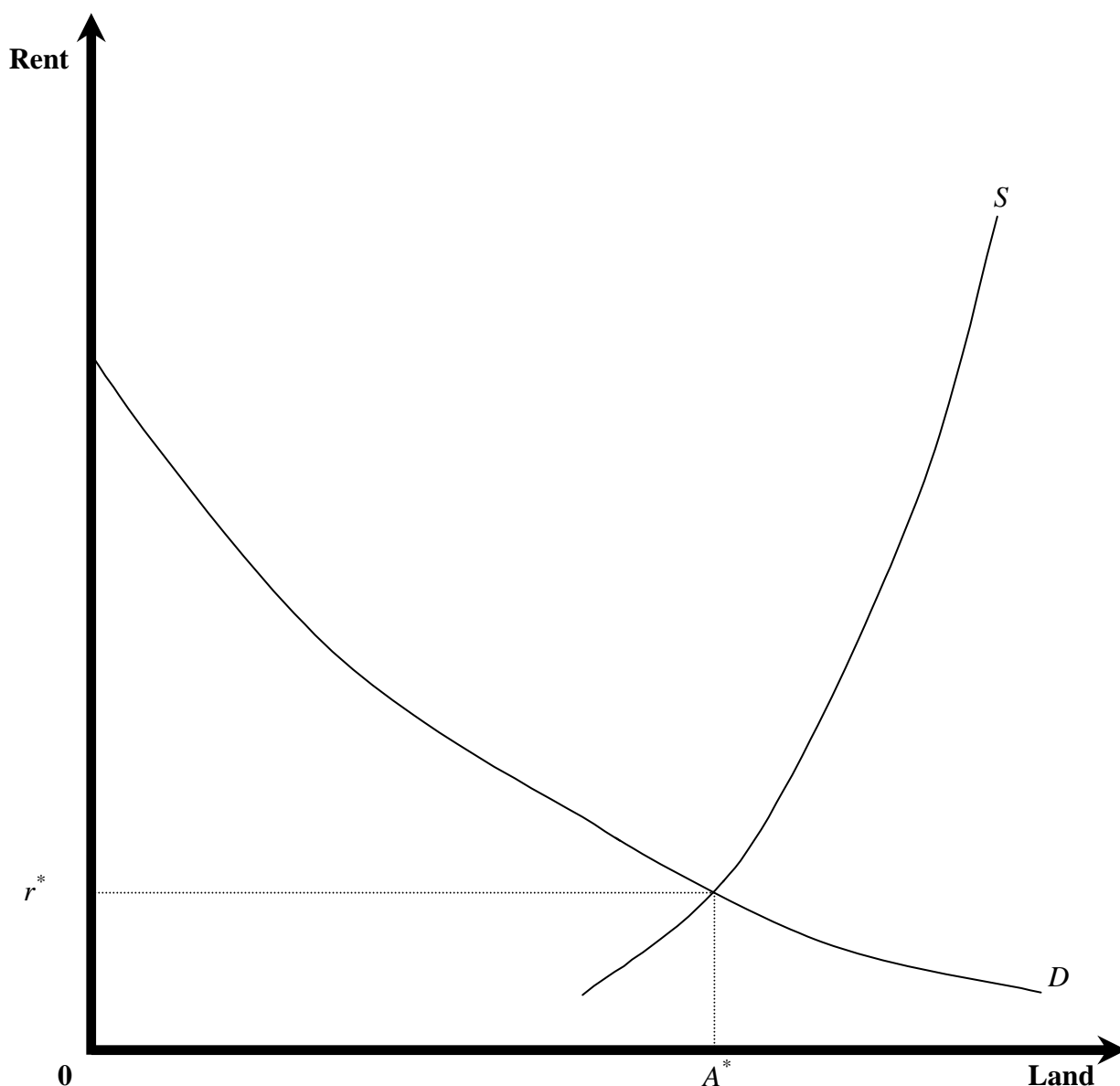
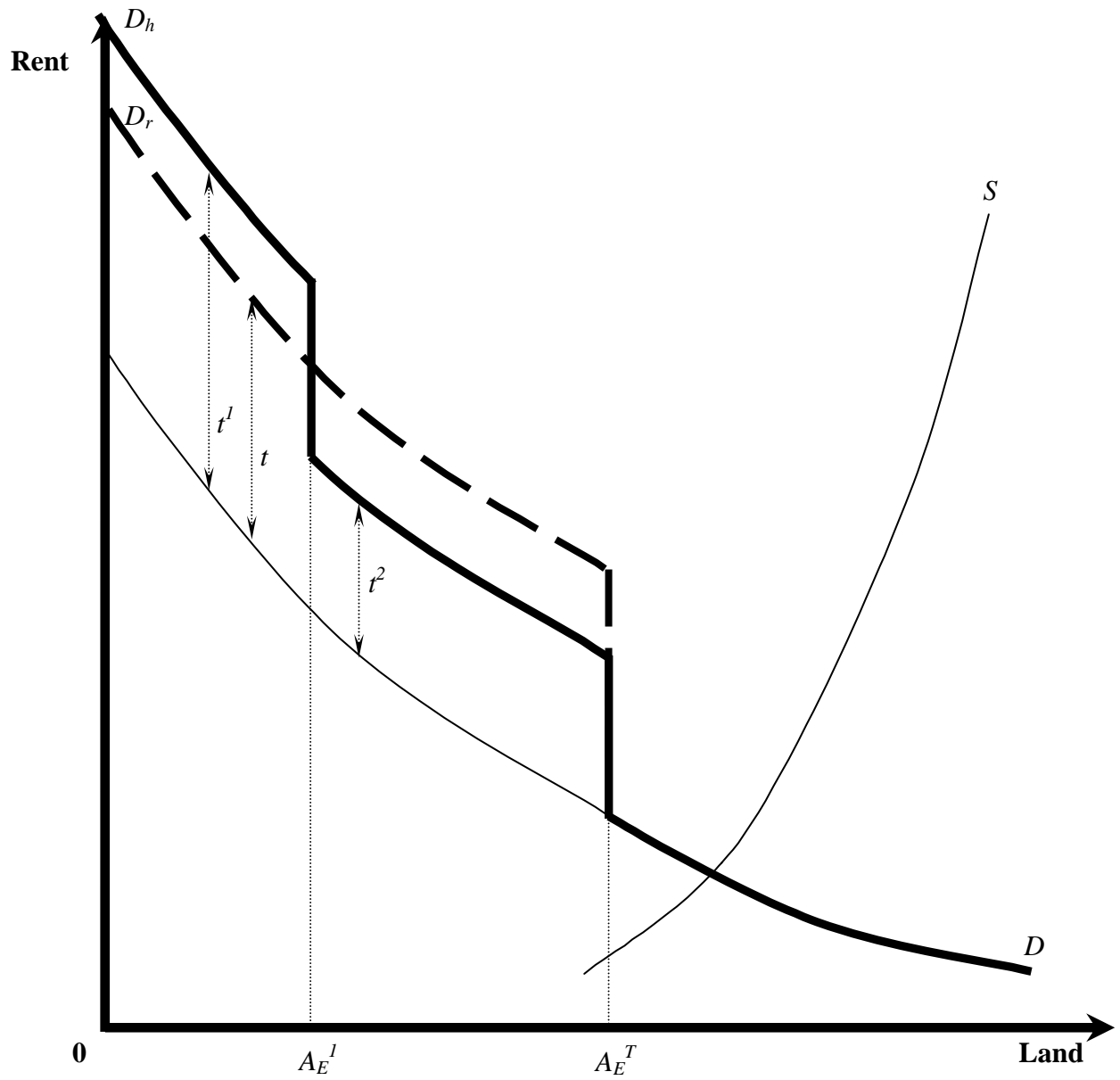


Figure A2: Land market with SPS



ANNEX 4: DATA SOURCES

In order to study the impact of subsidy capitalization on agricultural land prices, two types of data can be used: **farm-level micro data** and **regional or country level macro data**. In general, farm-level micro data, preferably from a panel dataset, are preferred by researchers as the use of this type of data reduces the problem of unobserved heterogeneity in the econometric approach. However, these type of data are not available for all countries and in some cases, such as for example to analyze the impact of SAPS on subsidy capitalization within one country, these data are not most appropriate type of data to use. The main source of data for the present study is the databases constructed by Ciaian, Kanacs and Swinnen (2010) and Swinnen and Vranken (2007, 2010). These databases will be updated by the different country expert teams using comparable data from Eurostat, FADN, national statistics and national experts survey data.

Databases constructed by Ciaian, Kanacs and Swinnen (2010) and Swinnen and Vranken (2007,2010)

The report "EU Land Markets and the Common Agricultural Policy" by Ciaian, Kanacs and Swinnen (2010) provides a useful database containing information on the evolution of the CAP measures as well as on the evolution of agricultural land markets (e.g. prices, share of land that is sold/rented, etc.) for a number of selected Old Member States (OMS) up to 2008. The existing database is updated based on the most recent information on the evolution of CAP measures as well as on the evolution of agricultural land markets for the selected OMS (Belgium, France, Germany, the Netherlands, Sweden and the UK).

For the New Member States (NMS), the database constructed in the preparation of the two studies "Review of the transnational restrictions maintained by New Member States with regard to the acquisition of agricultural real estate" and "Review of the transnational restrictions maintained by Bulgaria and Romania with regard to the acquisition of agricultural real estate" provides information on the evolution agricultural land markets up to 2007 (the Baltic states, Poland, Czech Republic, Slovakia and Hungary) and 2010 (Bulgaria and Romania). The existing database is updated based on the most recent information on agricultural land markets for selected NMS. In addition, information on the evolution of agricultural support measures (before and after EU accession) is added to the database.

Eurostat

The Eurostat data provide time series for two key variables: land rents and values. Land values are extracted from the Eurostat website Theme: Agriculture and fisheries, Table: APRI_AP_ALAND Land prices and rents - annual data.

Data on agricultural land values in most Member States come ultimately from administrative sources, having been recorded by the land registration or tax authorities, while data on land rents are collected by special surveys.

In addition to the land value data, we also use Eurostat for extracting macro data. All the key macroeconomic indicators, such as interest rate, inflation, GDP and growth are extracted from Eurostat website.

National statistics

The third major source of information comes from national statistical offices. The national statistical sources complement the European data on a more detailed scale and on many occasions provide information for the missing times series. In addition, data from national and regional statistical offices, national land registries and national tax authorities have been used to obtain detailed information on land market regulations.

In Belgium, up to 2004 the basic land price information concerning all land transactions are collected through a specific standardized form for purchases by the “Dienst van de Registratie”. These forms are then transferred to the national statistical institute, which publishes the land value information. Additional information is available on the type of land (arable and meadows) and region. The price for a given type of land and region can be obtained through the division of the total value by the total area sold. From 2004 onwards, the “Nationaal Instituut voor de Statistiek” stopped collecting information on land sales transactions.

The data collection for rental prices for Belgium differs somewhat from that concerning sales prices. Every year, in or around December, some 400 agricultural correspondents report on agricultural rents in their respective sector belonging to 27 designated areas. The unweighted arithmetical average of all recorded farm rents is deemed the average agricultural rent.

In France, the market value for agricultural land is collected by the Sociétés d’Aménagement Foncier et d’Etablissement Rural (SAFER) and the agricultural statistics services of the Directorate of Agriculture and Forestry.

The values for rents per hectare are derived from irregular surveys conducted by the central statistical studies and surveys service of the French ministry of agriculture. The results of these surveys are updated annually based on indicators.

In the Netherlands, the property and the transfers of property or real estate are recorded by the Netherlands’ cadastre, land registry and mapping agency (Kadaster) in a public register. All information on the transfers of agricultural land and the price of this land is directly derived from this registry.

Until 1995, all lease contracts were registered with the Dutch rental registries. In contrast to land sales, this information is not public in the Netherlands. We have therefore had to use aggregated information provided by the Central Bureau of Statistics Netherlands (CBS) and Eurostat.

Legal rental prices in the Netherlands change every three years. In general, rental agreements also change every three years. When the agreement changes (for the most part, only the rental price), data are passed from the Grondkamer [land control boards] to the CBS. As a new agreement mostly follows the termination of a former agreement and the duration of an agreement is as a rule a multiple of three years, every year on average one-third of the total rented area is recorded. This information is analysed to provide the weighted average rent prices for the Netherlands, provinces and agricultural regions.

FADN

The fourth source of data is the Farm Accountancy Data Network (FADN). With respect to the land rental market data, three specific variables are of interest: Total UAA (SE025), Rented UAA (SE030) and Rent paid (SE375). With respect to agricultural subsidies, five variables are of interest: Total UAA (SE025), Total subsidies – excluding on investments (SE605), Total subsidies on crops (SE610), Total subsidies on livestock (SE610) and Decoupled payments (SE630).

FADN data has three important advantages, namely the fact that it is farm-level panel data set, it has a large sample size and data are cross-country comparable. First, the FADN panel data set consists of farm-specific time series, which in general suffer from less econometrical problems. Second, the FADN sample is very large. In addition, because exactly the same information is collected in different countries and exactly the same techniques are used to determine the validity, reliability, and statistical significance of the data, the FADN data is comparable across countries.

However, the FADN data has also one important disadvantage as in general the lower bound on farm size to be included in the survey is rather high and, thus, by definition, the smallest farms, which also participate in the agricultural land market, are not represented in the FADN data. This is particularly problematic for some of the EU NMS, such as Poland and Romania, where still a significant proportion of the agricultural land is used by small agricultural enterprises, which in general also participate in the land market.

Interviews with local land experts

Finally, in order to get a better understanding of the developments in the different land markets of the different member states, statistical information on land market developments was complemented with survey data obtained from national expert interviews. More precisely, a number of local experts were consulted in each country, real estate experts, land registry departments and state property departments, farm union representatives, lawyers, local government officials etc. In addition to the general assessment of land market development in the particular country, national expert interviews provide qualitative data on land market regulations and institutions. In addition, they provide qualitative evidence on the drivers of land sales prices, drivers of rental prices and the CAP implementation and its impact on land values and rents

ANNEX 5: DRIVERS OF LAND PRICES

The main drivers of prices in the agricultural land markets are reported in Table A1-A4. The first column lists the primary determinants of land market prices, according to land market theory and national experts. The other columns indicate their relative significance in each country.

The results reported in the Table suggest that the factors underpinning farmland sales prices are highly heterogeneous across countries. The most common ones are agricultural commodity prices, urban pressures, infrastructural expansion, agricultural subsidies, farm size and coupled subsidies. Particular in the EU NMS, the DP are considered as an important driver for the increase in land prices. In most recent years (2008-2012), rural development payments became a more important driver of land prices than in the 2003-2007 period.

Table A1: Drivers of agricultural land sales prices in selected MS in the period 2008-2012

Drivers	Germany	Sweden	Impact 2008-2012		Poland	Romania
			UK	Slovakia		
Agricultural commodity prices	+++	+++	+++	+	+++	++
Agricultural productivity	0	+	0	0	+++	+
SPS/SAPS	0	++	+	+++	++	++
Coupled subsidies	0	0	0	+++	+ / ++	0
Rural development payments	0	+++	+	±	+ / ++	+
Other subsidies	0	+	0 to -	++	+ / ++	+
Expectations on the future of SPS/SAPS	0	0	-	++	+ / ++	
Taxes	0	0	0	--	0	0
Land sale regulations	0	0	0	+++	0	0
Farm size	+	++	+	0	+	++
Bio-energy	+++	+	0 to +	+	0	+
Environmental policies	0	+	+	++	+ / ++	0
Urban pressures (population growth)	0	++	+++	++	++	+
Infrastructural expansion (highways, airport, ...)	+	0	+	+	+	+
Macro-economic developments (economic crisis)	++	--	++	+	+++	--
Social developments (ageing of the population)	0	0	0 to +	0	0	-
Other factors (specify)			+++	+	+++	

Notes: +++ = strong increase; + = weak increase; 0 = no change; --- = strong decrease; -- = medium decrease; - = weak decrease.

Source: Own compilation based on the country reports.

Table A2: Drivers of agricultural land rental prices in selected MS in the period 2008-2012

Drivers	Impact 2008-2012				
	Germany	Sweden	Slovakia	Poland	Romania
Agricultural commodity prices	+++	+	+	++	++
Agricultural productivity	0	+	0	++	++
SPS/SAPS	0	++	+++	+ / ++	+++
Coupled subsidies	0	0	+++	+ / ++	
Rural development payments	0	+++	++	+ / ++	++
Other subsidies	0	+	++	+ / ++	
Expectations on the future of SPS	-	0	++	+ / ++	
Taxes	0	0	--	0	
Land sale regulations	0	0	+++	0	
Farm size	+	+++	0		+++
Bio-energy	+++	++	+	0	
Environmental policies	0	++	++	0	
Urban pressures (population growth)	0	+	++	+	
Infrastructural expansion (highways, airport, ...)	0	0	+	+	
Macro-economic developments (economic crisis)	0	--	+	++	
Social developments (ageing of the population)	0	0	0	+	--
Other factors (specify)	0		+	0	

Notes: +++ = strong increase; + = weak increase; 0 = no change; --- = strong decrease; -- = medium decrease; - = weak decrease.

Source: Own compilation based on the country reports.

Table A3. Drivers of agricultural land sales prices in selected MS in the period 2003-2007

Drivers	Impact 2003-2007										
	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Spain	Sweden	UK
Agricultural commodity prices	+++	+	++	+	+	00	++	+++	+	++	++
Agricultural productivity	0	+	+	+	0	+	0	+	++	+	0
SPS	+	++	+	0	++	+	+	0	+	+	0
Coupled subsidies	++	0	+	0	+	+	0	0	++	na	0
Rural development policies	0	++	0	0	0	+	0	0	0	0	0
Other subsidies	0	++	0	na	0	+	0	0	+	na	0
Taxes	+	0	0	+	0	+	0	0	0	0	+ / ++
Land sales regulations	0	0	0	0	0	0	0	0	0	na	0
Farm size	++	+	+	+ / 0	0	+	+	+++	00	++	+ / 0
Bio-energy	0	0	++	+ / 0	0	0	0	+++	+	+	0
Urban pressures	+++	0	+++	0	0	+++	+	+++	+++	+	+
Infrastructural expansion	++	0	+++	+	+	+++	++	++	+++	na	0
Informal institutions	0	++	0	0	0	++	0	0	0	+	+
Interest rates	+	0	+	0	+	0	+	na	00	+	0
Inflation	0	+	0	0	0	0	+		++	na	0
Other factors	+++	+++	++				0			+	+ + / +

Notes: +++ = strong increase; + = weak increase; 0 = no change; --- = strong decrease; -- = medium decrease; - = weak decrease.

Source: Own compilation based on the country reports.

Table A4. Drivers of agricultural land rental prices in selected MS in the period 2003-2007

Drivers	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Spain	Sweden	UK
Agricultural commodity prices	++	++	0	++	0	0	++	+++	0	++	++
Agricultural productivity	++	0	0	+++ / +	0	0	0	+++	++	++	0
SPS	+	+	0	+	++	++	+	0	+	++	+
Coupled subsidies	+	0	0	+	0	+	0	+++	0	na	0
Rural development policies	0	0	0	0	0	0	0	++	0	+	+
Other subsidies	0	0	0	+ / 0	0	0	0	0	0	+	0
Taxes	0	0	0	0	+	0	0		0	0	0
Land rental regulations	++	0	0	0	0	0	0		0	na	0
Farm size	+	+	0	0	0	0	0	+++	00	+++	0
Bio-energy	0	0	0	0	0	0	0	+++	0	+	0
Urban pressures	+	++	0	+	0	0	++	+++	++	0	0
Infrastructural expansion	+	+	0	++	0	++	0	++	++	0	+
Informal institutions	0	+++	0	0	0	+++	0	0	0	+	0
Interest rates	0	++	0	0	0	+++	0	0	0	+	0
Inflation	0	+	0	+	+	0	0	0	0	na	0
Other factors		+++							0	+	0

Notes: +++ = strong increase; + = weak increase; 0 = no change; --- = strong decrease; -- = medium decrease; - = weak decrease.

Source: Own compilation based on the country reports.

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